Contents

Federal Aviation Administration (FAA)
Records

a few DT updates please

From: "Forkner, Mark A" <mark.a.forkner@boeing.com>
To: [redacted](FAA)" [redacted]@faa.gov>
Cc: [redacted]@boeing.com>
Date: Tue, 17 Jan 2017 19:00:58 -0500

Hi [redacted]

We're starting to work on the reverse differences DT, and I noticed a few things that should be changed in the DT for the NG to MAX, that are in the draft FSB:

Flight Controls:
Delete MCAS, recall we decided we weren't going to cover it in the FCOM or the CBT, since it's way outside the normal operating envelope
Delete reference to Direct Lift Control (DLC), we decided to not refer to the system in those terms, as it is more of an engineering term. It's removed from the FCOM and the CBT

Any updated on when you think you'll get all the issues resolved with 280 and put this on the street for public comment?

Thanks!

Mark

Captain Mark Forkner
737 Chief Technical Pilot
[redacted] ~ Desk
~ Mobile
mark.a.forkner@boeing.com

Hello from down Under!

From: "Forkner, Mark A" <mark.a.forkner@boeing.com>
To: [redacted] (FAA)" [redacted]@faa.gov>
Date: Mon, 05 Oct 2015 15:47:43 -0400

H[redacted]

It's 630am here, just getting ready to hit breakfast then try and jedi mind trick these people into buying some airplanes!

[redacted]

Captain Mark Forkner
737 Chief Technical Pilot
[redacted] ~ Desk
~ Mobi e
mark.a.forkner@boeing.com

BOEING EDGE
Flight Services

MCAS lives in both FCCs

From: "Forkner, Mark A" <mark.a.forkner@boeing.com>
To: [redacted] (FAA)" [redacted]@faa.gov>, [redacted] (FAA)" [redacted]@faa.gov>
Cc: [redacted]@boeing.com>, [redacted]@boeing.com>, "Gustavsson, Patrik H" [redacted]@boeing.com>
Date: Wed, 30 Mar 2016 11:16:45 -0400

Hi [redacted],

I confirmed with the Flight Controls engineers that MCAS does live in both FCCs, and only needs one to function.

So given that, are you ok with us removing all reference to MCAS from the FCOM and the training as we discussed, as it's completely transparent to the flight crew and only operates WAY outside of the normal operating envelope?

Thanks, and see you tomorrow!

Mark

Captain Mark Forkner
737 Chief Technical Pilot
[redacted] ~ Desk
~ Mobi e
mark.a.forkner@boeing.com

RE: Hi there

From: "Forkner, Mark A" <mark.a.forkner@boeing.com>
To: [redacted] (FAA)" [redacted]@faa.gov>
Date: Thu, 03 Nov 2016 15:27:47 -0400

[redacted] No I've been working to certify the new 737-8 (MAX) with all the regulators all over the world. Led by the AEG. It was a huge deal, but I got what I needed to, at least so far. ☺ You know me, I usually get what I want! ☺

[redacted]

Captain Mark Forkner
737 Chief Technical Pilot
[redacted]
mark.a.forkner@boeing.com

From: [redacted]@faa.gov [mailto[redacted]@faa.gov]
Sent: Thursday, November 03, 2016 12:23 PM
To: Forkner, Mark A <mark.a.forkner@boeing.com>
Subject: RE: Hi there

[redacted]

Very Respectfully,

[redacted]

From: Forkner, Mark A [mailto:mark.a.forkner@boeing.com]
Sent: Thursday, November 03, 2016 12:16 PM
To: [redacted](FAA)
Subject: RE: Hi there

[redacted] Things are calming down a bit for my airplane cert, at least for now. I'm doing a bunch of travelling though the next few months; simulator validations, jedi-mind tricking regulators into accepting the training that I got accepted by FAA etc.

[redacted]

Captain Mark Forkner

737 Chief Technical Pilot
[redacted] ~ Desk
~ Mobile
mark.a.forkner@boeing.com

From: [redacted]@faa.gov [redacted]@faa.gov]
Sent: Thursday, November 03, 2016 12:14 PM
To: Forkner, Mark A <mark.a.forkner@boeing.com>
Subject: RE: Hi there

[redacted]

Very Respectfully,

[redacted]

From: Forkner, Mark A [mailto:mark.a.forkner@boeing.com]
Sent: Thursday, November 03, 2016 12:12 PM
To: [redacted](FAA)
Subject: Hi there

[redacted]

Captain Mark Forkner

737 Chief Technical Pilot
[redacted] ~ Desk
~ Mobile
mark.a.forkner@boeing.com

RE: MAX FCOM/QRH

From: "Forkner, Mark A" <mark.a.forkner@boeing.com>
To: [redacted]@boeing.com>, [redacted] (FAA)" [redacted]@faa.gov>
Date: Wed, 09 Nov 2016 16:25:53 -0500

How are you coming on the FSB report BTW [redacted]? I'm out of town all next week in Montreal doing sim flyouts. Can we get together before Turkey Day to wrap this up you think?

Captain Mark Forkner
737 Chief Technical Pilot
[redacted] ~ Desk
[redacted] ~ Mobile
mark.a.forkner@boeing.com

From: [redacted]
Sen Wednesday, November 09, 2016 1:25 PM
To: [redacted]@faa.gov
Cc: Forkner, Mark A <mark.a.forkner@boeing.com>
Subject: RE: MAX FCOM/QRH

[redacted]
We will go with Option 1. It will be the TBC version, no MAX performance.
I confirmed with the AFM group that they will have the MAX performance information for your review prior to TC.
[redacted]

From: [redacted]@faa.gov [redacted]@faa.gov]
Sent: Thursday, November 03, 2016 1:22 PM
To: [redacted]@boeing.com>
Cc: Forkner, Mark A <mark.a.forkner@boeing.com>
Subject: RE: MAX FCOM/QRH

[redacted] Option 1 is fine. I'm assuming the data supporting the inflight performance and performance dispatch generation are part of the AFM which will also come through me for review and concurrence prior to TC.

[redacted]
Seattle Aircraft Evaluation Group
[redacted]

From: [redacted]@boeing.com]
Sent: Thursday, November 03, 2016 1:07 PM
To: [redacted](FAA)
Cc: Forkner, Mark A
Subject: MAX FCOM/QRH

Aloha,
The PQP calls for Boeing to provide the "final" MAX 8 FCOM and QRH by December 15, 2016.
I just learned that the Performance Inflight and Performance Dispatch data generation is being delayed. Our Aero department needs a little more time than originally thought to crunch the numbers that come out of flight test. The best answer I get from the manuals folks is "late December earliest" for the performance.

Option 1: Provide you the manuals on Dec 15 as promised without MAX performance, and send you the complete manuals when the performance is available
Option 2: Wait until the performance data is incorporated to give you the manuals.

My preference would be Option 1, as it gives you something to look at in December.

Your thoughts?
Thanks
[redacted]

[redacted]
F ight Technica & Safety
[redacted] ~ Desk
~ Mobi e

[redacted]@boeing.com

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RE: Template question

From: "Forkner, Mark A" <mark.a.forkner@boeing.com>
To: [redacted] (FAA)" [redacted]@faa.gov>, [redacted] (FAA)" [redacted]@faa.gov>
Date: Fri, 09 Feb 2018 11:48:22 -0500

I'm all for pulling them out altogether if you guys can jedi mind trick 280 into doing what they let Brand A get away with (i.e. not publishing them)

Captain Mark Forkner
737 Chief Technical Pilot
[redacted] ~ Desk
~ Mobile
mark.a.forkner@boeing.com

From: [redacted]@faa.gov [mailto:[redacted]@faa.gov]
Sent: Friday, February 09, 2018 8:46 AM
To: [redacted]@faa.gov
Cc: Forkner, Mark A <mark.a.forkner@boeing.com>
Subject: RE: Template question

Mark, to expand on the conversation of DT's…there has been a recent push back from OEM's regarding the inclusion of DT table all together. Some OEM's are saying they do not want any DT's included because they are proprietary. 280 let one FSB report post without any DT's and now the negotiation is open for discussion.

[redacted]
Seattle Aircraft Evaluation Group
[redacted]

We value your feedback and seek to improve the services we provide. Please take a few moments to visit the website shown below to let us know how we did.
Select Large Transport Aircraft Seattle AEG from the pull-down menu before writing your comments. Thank you.
https://www.faa.gov/about/office_org/headquarters_offices/avs/stakeholder_feedback/afx/afs100/

We will be moving to a new building on Feb. 26th. As of Feb. 26th please use the following information to contact me:

[redacted]

From: [redacted] (FAA)
Sent: Friday, February 09, 2018 8:30 AM
To: [redacted] (FAA) [redacted]@faa.gov>
Cc: Forkner, Mark A <mark.a.forkner@boeing.com>
Subject: RE: Template question

Funny you ask. I have not submitted a -10 787 FSB report yet. I will not do that until they publish the rewrite one first. I do not want to muddy the waters what we are "negotiating" about. I am keeping a record of the many hours spent dealing with a simple template revision. When I submit the -10 report it will not have a new DT. I will hold tight to that until told otherwise.

[redacted]

Seattle Aircraft Evaluation Group
[redacted]

We value your feedback and seek to improve the services we provide. Please take a few moments to visit the website shown below to let us know how we did. Select Large Transport Aircraft Seattle AEG from the pull-down menu before writing your comments. Thank you.
https://www.faa.gov/about/office_org/headquarters_offices/avs/stakeholder_feedback/afx/afs100/

From: [redacted] FAA)
Sent: Thursday, February 08, 2018 3:07 PM
To: [redacted] FAA) [redacted]@faa.gov>
Cc: Forkner, Mark A <mark.a.forkner@boeing.com>
Subject: FW: Template question

[redacted] what say you?

[redacted]

Seattle Aircraft Evaluation Group
[redacted] (w)
(c)

We value your feedback and seek to improve the services we provide. Please take a few moments to visit the website shown below to let us know how we did.
Select Large Transport Aircraft Seattle AEG from the pull-down menu before writing your comments. Thank you.
https://www.faa.gov/about/office_org/headquarters_offices/avs/stakeholder_feedback/afx/afs100/

We will be moving to a new building on Feb. 26th. As of Feb. 26th please use the following information to contact me:

[redacted]

From: Forkner, Mark A [mailto:mark.a.forkner@boeing.com]
Sent: Thursday, February 08, 2018 1:38 PM
To: [redacted] (FAA) [redacted]@faa.gov>
Subject: Template question

Hi [redacted]

Can you ask [redacted] if 280 asked [redacted] to update the DT for the 787 10 from the 777, to itemize each individual change and its training level, like [redacted] made you do in the MAX? It's curious that [redacted] allowed it to go to public comment with something that resembled this as I understand it? Attached.

Thanks

Mark

Captain Mark Forkner
737 Chief Technical Pilot
[redacted] ~ Desk
[redacted] ~ Mobile
mark.a.forkner@boeing.com

U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

July 11, 2019

The Honorable Peter A. DeFazio
Chairman, Committee on Transportation & Infrastructure
House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

This is in response to your April 1, 2019, letter seeking information and documents related to the certification of the Boeing 737 MAX aircraft by the Federal Aviation Administration (FAA). This seventh production supplements FAA's document productions on May 9, June 3, June 7, June 13, June 18, and June 28, 2019, continuing our ongoing production of documents and information to the Committee on Transportation and Infrastructure. In addition, this letter includes information partially responsive to your request of June 6, 2019, regarding the functionality of the Angle of Attack (AOA) disagree message on certain Boeing 737 MAX aircraft.

Enclosed are documents you requested relating to the review of the 737 MAX 8 by the European Union Aviation Safety Agency. As we have communicated to your staff, some of these documents contain highly sensitive proprietary business information, some of which are also subject to export control restrictions. The Trade Secrets Act, 18 U.S.C. § 1905, provides criminal penalties for publishing, divulging, or disclosing trade secrets. Disclosure of proprietary business information provided to the FAA could also harm aviation safety by impairing the FAA's ability to obtain similar documents and data from regulated entities in the future. Therefore, we request you treat these documents and the data they contain as confidential.

You also requested information about how the FAA considers, and in some cases requires, the installation of certain features during the aircraft certification process. Required safety standards and features for large aircraft are established in 14 CFR Part 25 ("Airworthiness Standards: Transport Category Airplanes"). Features required to meet those safety standards are mandatory on all FAA-certified large aircraft, including the Boeing 737 MAX. There are no optional safety standards or features.

The AOA display indicator and the AOA disagree message, which you inquired about specifically, are not required under 14 CFR Part 25 because there are no in-flight pilot operational procedures or requisite decisions defined for their use or inoperability. In short, AOA

information is not necessary to operate a Part 25 aircraft safely. However, individual air carriers may elect to install AOA indicators for their operations.

For context, pitch refers to the angle of an airplane relative to level flight, whereas AOA is the angle between the oncoming air and the wing of the aircraft. As the angle of the wing increases in relation to the oncoming path of the air, lift increases and the airplane will fly higher, provided the air flows smoothly over the wing. An AOA sensor or "vane" is a small probe located on the fuselage or the wing of the aircraft that detects the airplane's AOA in flight and sends that information to the optional display in the cockpit and to the airplane's flight control system.

The 737 MAX has two AOA sensors: one on each side of the nose of the fuselage. An AOA indicator is a display of the AOA reading on the primary flight display (PFD). The AOA disagree message is displayed on the PFD when readings from the two AOA sensors differ by more than 10 degrees. The primary purposes of PFDs are to show pitch (via the artificial horizon covering most of the screen), airspeed (shown on the left side of the screen), and altitude (shown on the right side of the screen).

Once certified by the FAA, *all* features included on the airplane become part of the certified type design or approved type design. These features are mandatory in each airplane produced to that type design thereafter, whether or not they are required for safety. A manufacturer cannot alter the airplane's features after it has been certified. If a manufacturer decides to include a new feature for any reason, including optional features, the inclusion of that feature must receive approval by the FAA, and it becomes a required feature and part of the approved type design. Although an AOA disagree message was not necessary to meet FAA safety regulations, once it was made part of the approved type design, it was required to be installed and functional on all 737 MAX airplanes Boeing produced.

In October 2017, Boeing determined that the AOA disagree message was not included on 737 MAX 8 airplanes unless the operator had elected to install the optional AOA indicator. Several airlines chose not to include the AOA indicator option. According to Boeing, "The software delivered to Boeing linked the AOA Disagree [message] to the AOA indicator, which is an optional feature on the MAX and the NG. Accordingly, the software activated the AOA Disagree [message] only if an airline opted for the AOA indicator. When the discrepancy between the requirements and the software was identified, Boeing . . . determined that the absence of the AOA Disagree alert did not adversely impact airplane safety or operation."[1]

In November 2018, following the Lion Air accident on October 29, 2018, Boeing notified FAA officials in Seattle of the inoperative AOA disagree message. The FAA Seattle office then convened a series of Corrective Action Review Boards, which evaluated Boeing's determination and concurred that the inoperative message was not a safety issue. The FAA was preparing to issue a Special Airworthiness Information Bulletin on the issue when the Ethiopian Airlines crash occurred.[2]

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[1] Press Release, The Boeing Company, Boeing Statement on AOA Disagree Alert (May 5, 2019), *available at* https://boeing.mediaroom.com/news-releases-statements?item=130431.

[2] An SAIB is an information tool that alerts, educates, and makes recommendations to the aviation community.

The FAA is currently reviewing the software update Boeing is preparing to address the inoperability of the AOA disagree message in some 737 MAX aircraft. We are committed to working with the Technical Advisory Board, the Joint Authorities Technical Review for the Boeing 737 MAX, the Special Committee to Review FAA's Aircraft Certification Process, the National Transportation Safety Board, other major international aviation safety authorities (such as the European Union Aviation Safety Agency), the Department of Transportation's Office of Inspector General, and the relevant committees of jurisdiction in Congress to address any recommendations that can further improve aviation safety in the United States and abroad.

An identical letter has been sent to Subcommittee Chairman Larsen. FAA is continuing to work to provide responsive documents to the Committee and will continue to provide responsive documents and information on a rolling basis. If I can be of further assistance, please do not hesitate to contact me or my staff.

Sincerely,

Daniel K. Elwell
Acting Administrator

Enclosures

cc: The Honorable Sam Graves, Ranking Member, Committee on Transportation & Infrastructure

The Honorable Garret Graves, Ranking Member, Subcommittee on Aviation, Committee on Transportation & Infrastructure

Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington, DC 20515

Peter A. DeFazio
Chairman

Sam Graves, MO
Ranking Member

Katherine W. Dedrick, Staff Director

Paul J. Sass, Republican Staff Director

November 7, 2019

The Honorable Stephen M. Dickson
Administrator
Federal Aviation Administration
800 Independence Avenue S.W.
Washington, D.C. 20591

Dear Administrator Dickson:

As you know, our Committee has been investigating the design and development of Boeing's 737 MAX, the Federal Aviation Administration's (FAA) certification processes, and related issues. While our investigation is ongoing, we are concerned about two additional safety issues about which we have received detailed information. Both appear to involve serious, potentially catastrophic safety concerns raised by FAA technical specialists that FAA management ultimately overruled after Boeing objected. These incidents raise questions about how the agency weighs the validity of safety issues raised by its own experts compared to objections raised by the aircraft manufacturers the FAA is supposed to oversee.

Boeing 737 MAX Rudder Cable Protection from Uncontained Engine Failure

The first issue involves the adequacy of rudder cable protection on the Boeing 737 MAX from an uncontained engine failure and the possibility of severance of the cable and a potentially catastrophic loss of control.

In 2014, a manager in the FAA's Transport Airplane Directorate issued a memo to a higher official in the FAA's Aircraft Certification Service asserting that Boeing had not incorporated adequate protection into the 737 MAX rudder cable as required by 14 C.F.R. § 25.903(d)(1).[1] The memo noted Boeing's previous agreement to show compliance with the latest guidance, found in Advisory Circular 20-128A, which applied lessons learned from the 1989 United Airlines flight 232 accident near Sioux City, Iowa, in which debris from an uncontained engine failure severed hydraulic lines, resulting in a crash landing that left 112 people dead. Boeing objected to making changes to the design of the 737 MAX rudder cable, arguing that changes would be impractical and noting the

[1] FAA Transport Airplane Directorate memo to FAA Aircraft Certification Service, 3/10/14, updated 9/22/14, p. 1.

company's concern about the potential impact on "resources and program schedules."[2] The FAA's Transport Airplane Directorate found Boeing's position unacceptable and stated its intention to release an issue paper to Boeing "requiring they protect the rudder cable from [uncontained engine failure] per AC 20-128A."[3]

In 2015, the FAA drafted an issue paper, finalized in 2016, that offered Boeing a chance to establish compliance without implementing a design change.[4] At least six FAA specialists refused to concur.[5] Strangely, the issue paper also suggested that, based on the "excellent" service history of the different engine on the prior version of the 737, the FAA "expected" the new, larger LEAP engine would have a similarly low rate of uncontained engine failures.[6] From an analytical perspective, that argument appears to be nonsensical since the FAA was making an unfounded conclusion about the reliability of a then-unproven new engine based on the performance of a completely different older engine. This statement, however, was not part of a showing or finding of compliance.

When concern about the issue paper was submitted to the FAA's safety review process, a panel was established to review the matter. On January 13, 2017, the panel recommended that the FAA "[i]nform Boeing there is currently insufficient information, data and coordination between the FAA and Boeing such that a determination of compliance can be made . . ."[7] The panel also rejected Boeing's position that design changes were impractical, finding, instead, that two design changes were, in fact, practical.[8] The panel also made clear the inappropriateness of consideration of reliability of a previously approved engine to demonstrate compliance, and that the new LEAP engine was sufficiently different from its predecessor that past performance of the older engine would not be relevant in predicting the new engine's performance.[9] Despite these concerns the 737 MAX gained certification from the FAA two months later in March 2017.

It is our understanding that non-concurrence by FAA technical specialists is fairly infrequent and not to be taken lightly. In addition, my staff has been told that it was virtually unprecedented for six or more FAA specialists to jointly non-concur on a single issue, highlighting the gravity of their concerns regarding the rudder cable issue. Despite all of this, in June 2017, the FAA's Transport Airplane Directorate upheld the controversial issue paper.[10]

Lightning Protection for Boeing 787 Fuel Tanks

Our Committee has also received information and documents suggesting Boeing implemented a design change on its 787 Dreamliner lightning protection features to which multiple FAA specialists ultimately objected. In addition to the merits of the safety risks the FAA experts

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[2] FAA Transport Airplane Directorate memo to FAA Aircraft Certification Service, 3/10/14, updated 9/22/14, p. 2.
[3] FAA Transport Airplane Directorate memo to FAA Aircraft Certification Service, 3/10/14, updated 9/22/14, p. 2.
[4] Issue Paper: Engine Rotor Burst and Rudder Mechanical Flight Control Cables, 7/24/15.
[5] Issue Paper: Engine Rotor Burst and Rudder Mechanical Flight Control Cables, 7/24/15.
[6] Issue Paper: Engine Rotor Burst and Rudder Mechanical Flight Control Cables, 7/24/15.
[7] SRP Item 10 SME Panel – Findings and Recommendations to the SRP Safety Oversight Board, 1/13/17.
[8] SRP Item 10 SME Panel – Findings and Recommendations to the SRP Safety Oversight Board, 1/13/17.
[9] SRP Item 10 SME Panel – Findings and Recommendations to the SRP Safety Oversight Board, 1/13/17.
[10] FAA Transport Airplane Directorate memo to FAA Aircraft Certification Service, 6/30/17.

raised, it is also of great concern that Boeing reportedly produced approximately 40 airplanes prior to the FAA's approval of the design change. If accurate, that is an astonishing fact that suggests either willful neglect of the Federal aviation regulatory structure or an oversight system in need of desperate repair.

The change involves the removal of copper foil from zone 3 of the wing of the 787 Dreamliner, which could result in significantly higher conducted currents in that zone as well as increase the number of ignition sources in the fuel tanks. It appears FAA specialists believed Boeing's design change failed to comply with Special Condition 25-414-SC, which requires Boeing to show that a fuel tank ignition would be extremely improbable.

Lightning strikes on aircraft are a fairly routine occurrence. This is true of the 787 Dreamliner, an aircraft built of more than 50 percent carbon fiber composites. "While incredibly lightweight and strong, such aircraft composites are not inherently conductive, thus requiring additional protective coatings to mitigate lightning strike damage," according to a technical blog post on lightning protection measures.[11] Two years ago, a British Airways Boeing 787 was struck by lightning shortly after it departed London's Heathrow airport. When the aircraft landed in Chennai, India, it was discovered the aircraft had more than 40 holes in the fuselage from the lightning strike.[12] Three years earlier, in October 2014, a United Airlines Boeing 787 was struck by lightning leaving London's Heathrow airport en route to Houston, Texas.[13]

On February 22, 2019, the FAA's Boeing Aviation Safety Oversight Office (BASOO) formally rejected Boeing's lightning protection design change.[14] Apparently, Boeing appealed the decision, and a meeting was held on February 27, 2019, during which a Boeing official reportedly stated that Boeing employees had discussed the issue with the FAA's Associate Administrator for Aviation Safety. On March 1, 2019, FAA management reversed course, and accepted Boeing's position.[15]

It is our understanding that the FAA has recently tasked Boeing with performing a "numerical risk assessment of the fuel tank explosion risk from lightening related ignition sources that addresses each Model 787 configuration that is determined to exist to date."[16] The FAA apparently plans to use this assessment "to determine if any corrective actions to reduce the risk of a fuel tank explosion should be required by airworthiness directive action."[17]

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[11] Jennifer Segui, "Protecting Aircraft Composites from Lightning Strike Damage," COMSOL Blog, June 11, 2015, accessed here: https://www.comsol.com/blogs/protecting-aircraft-composites-from-lightning-strike-damage/

[12] "Boeing 787 Grounded for a Week after Lightning Strike," August 5, 2017, Air Insight, accessed here: https://airinsight.com/boeing-787-grounded-week-lightning-strike/

[13] Brett Macdonald, "Why Superior Lightning Strike Protection Is Vital In Aerospace," June 14, 2018, Dexmet Corporation, accessed here: https://www.dexmet.com/blog/why-superior-lightning-strike-protection-is-vital-in-aerospace

[14] Feb. 22, 2019 letter from FAA BASOO to Boeing Organization Designation Authorization, p. 3.

[15] Mar. 1, 2019 letter from FAA BASOO to Boeing Organization Designation Authorization.

[16] Oct. 15, 2019 letter form FAA Seattle Aircraft Certification Office Branch to Boeing Organization Designation Authorization, p. 2.

[17] Oct. 15, 2019 letter form FAA Seattle Aircraft Certification Office Branch to Boeing Organization Designation Authorization, p. 2.

While we appreciate that the FAA is finally taking some action on this issue, we are deeply concerned that the agency is just now asking Boeing to provide analysis to enable the FAA "to determine if any corrective actions" are required. It appears Boeing took actions that may have violated FAA requirements in the first place by taking unilateral steps to change the design of the aircraft's lightning protection system. Asking Boeing to now review its own work in the aftermath of those events, if true, to help the FAA determine what corrective actions Boeing may need to take seems woefully inadequate to ensure the safety of the flying public. In addition, this process will take several months, and we would like to know how the FAA is satisfied that the risk is sufficiently low that these 787s can continue flying in revenue service before the numerical risk assessment is completed.

The two cases above regarding the 737 MAX and the 787 Dreamliner suggest that the opinions and expert advice of the FAA's safety and technical experts are being circumvented or sidelined while the interests of Boeing are being elevated by FAA senior management. There may be reasonable explanations for FAA management overriding the decisions of its own technical experts at the behest of the manufacturer it regulates, but we would like a clear accounting of those explanations in the two instances described above.

We respectfully request that you please provide:

1) A detailed explanation of how the FAA decided to overrule its own safety specialists with regard to the two safety issues described above, including the process FAA relied upon to make those determinations and who at FAA made those ultimate decisions. In addition, please describe what the FAA is doing to ensure that these two issues do not pose a risk to the flying public.

2) An explanation of what the FAA is doing to ensure that manufacturers do not have an incentive to attempt end-runs around FAA technical specialists by going to senior FAA management.

3) A list of all lightning protection-related regulations, requirements, or standards applicable to the 787 aircraft certification at the time Boeing produced such aircraft before FAA-approval of the Boeing design change, and a description of FAA actions taken in response to any deviations of those regulations, requirements, or standards by Boeing.

4) An explanation of the FAA's conclusion that the 787s produced in response to the design change are safe to operate in revenue service before Boeing completes its numerical risk assessment of the overall fuel tank explosion risk from lightning related ignition sources, and before the FAA has had an opportunity to evaluate that assessment.

Please respond to this request by November 21, 2019. Thank you for your prompt assistance in this matter.

Sincerely,

PETER A. DeFAZIO
Chair

RICK LARSEN
Chair
Subcommittee on Aviation

cc: The Honorable Sam Graves, Ranking Member
Committee on Transportation & Infrastructure

The Honorable Garret Graves, Ranking Member
Subcommittee on Aviation

U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

December 6, 2019

The Honorable Peter DeFazio
Chairman, Committee on Transportation
and Infrastructure
Washington, DC 20515

Dear Mr. Chairman:

Thank you for your November 7 letter, cosigned by Chairman Rick Larsen, requesting information about certain design aspects of the Boeing 787 Dreamliner and the Boeing 737 MAX. The FAA's mission is to provide the safest, most efficient aerospace system in the world, and our highest priority is the safety of the flying public.

The concerns you raise about each of these aircraft center on the FAA's processes for certifying the design and modification of civil aircraft, as well as the integrity of these processes. To be clear, debate, dialogue, and exchange are a necessary and healthy part of the aircraft certification process. Disagreement does not indicate dysfunctionality. The opposite is true—it shows the very openness to deliberation that the FAA seeks to foster. Where possible we strive for consensus in the aircraft certification process, but in some cases, it may not be possible to reach a consensus. When that occurs, FAA processes ensure that the FAA considers and adjudicates differing opinions, from within the agency and from regulated entities.

In both of the situations you referenced, the FAA made final compliance decisions based on the applicable regulatory requirements, established guidance (including issue papers), and data from the manufacturer supporting the showing of compliance. The FAA follows the practices established by the Office of Management and Budget[1] to ensure that its guidance documents are developed with appropriate review and public participation, are accessible and transparent to the public, and are not improperly treated as legally binding requirements. Compliance with the regulations is always manufacturers' obligation, and FAA reviews and determines their compliance with the regulations. Established guidance provides a means of assessing compliance with those regulations, but guidance is not legally binding in its own right and conformity with guidance (as distinct from the regulations) is voluntary only. The final approval of designs is based on regulatory requirements, guidance, and input from subject matter experts.

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[1] Office of Management and Budget, Final Bulletin for Agency Good Guidance Practices, Federal Register, Volume 72, no. 16, January 25, 2007 [72 FR 3432]

In both cases at issue here, the FAA reviewed the published regulations and established guidance, and determined that Boeing's method of compliance is consistent with the applicable regulations and guidance, and is consistent with the application of those regulations and guidance for previous aircraft types.

In the aircraft certification process, the FAA promotes deliberation through the process of seeking concurrence on issue papers and through the Safety Review Process (SRP) to document and review safety concerns. For example, under the SRP an Oversight Board reviews reported safety issues and may submit recommendation(s) to the affected Directorate or Division manager. Under the SRP, the decision whether to implement the Board's recommendation(s) remains with the manager. However, if the manager does not implement the recommendations, the manager must document the reasons for that decision.

In one of the cases you raise, several technical specialists disagreed with the proposed design of the rudder control system on the 737 MAX and did not concur with the corresponding issue paper. The issue was elevated to the SRP Board, which considered the matter, including dissenting views, and submitted recommendations to the Manager of the Transport Airplane Directorate. The Manager, too, was a qualified safety expert with a technical background. In accordance with the Safety Review Process, the Manager considered the Board's recommendations and, after ultimately determining not to implement them, submitted a response to the Board documenting the reasons for his decision. Throughout, the FAA followed the SRP and documented its actions as required—ensuring it allowed for and considered other views and the Board's recommendations, and explained the basis for its decision to the Board.

As another method of promoting deliberation, the FAA allows industry to appeal or request reconsideration of a decision made by the Aviation Safety organization (AVS) in performing its regulatory and guidance responsibilities.[2] This process provides a thorough reconsideration of an AVS decision through progressively higher levels of management, allowing each level to reexamine information to assess the decisions made by subordinate organizations.[3] In addition, the FAA has established additional expectations for the Boeing Organization Designation Authorization (ODA) that are to be met prior to initiating this process. The Boeing ODA Procedures Manual, which governs Boeing's ODA and is approved by the FAA, contains an appeal process through which Boeing first appeals decisions to the ODA Unit, and then to the FAA Organization Management Team which oversees the ODA Unit. Both the rudder cable protection issue on the Boeing 737 MAX and the fuel tank lightning protection issue on the Boeing 787 Dreamliner were addressed by the appropriate levels of management within the FAA, and not at FAA Headquarters. At FAA, decisions are made by qualified safety experts whether at the line or management level.

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[2] AVS-001-013 "AVS Consistency and Standardization Initiative (CSI) Process."

[3] Your letter states: "On February 22, 2019, the FAA's Boeing Aviation Safety Oversight Office (BASOO) formally rejected Boeing's lightning protection design change. Apparently, Boeing appealed the decision, and a meeting was held on February 27, 2019, during which a Boeing official reportedly stated that Boeing employees had discussed the issue with the FAA's Associate Administrator for Aviation Safety. On March 1, 2019, FAA management reversed course, and accepted Boeing's position." The Associate Administrator for Aviation Safety does not recall having any such discussion with Boeing, and he had no involvement in the FAA's decision-making in this matter.

You also requested an explanation of the FAA's conclusion that the Boeing 787s produced in response to the design change are currently safe to operate in revenue service. To provide some clarity, the FAA's letter of October 15, 2019, asking for a Boeing 787 fuel tank explosion risk assessment, was not directly driven by the manufacturer's recent design change to delete copper foil from the wing skin composite material in certain wing areas. Boeing showed that design change complied with the FAA's special conditions for the Boeing 787 that set requirements for fuel tank structural lightning protection. As part of the design approval process, the FAA determined the design change had no unsafe features or characteristics (Title 14, Code of Federal Regulations 21.21(b)(2)).

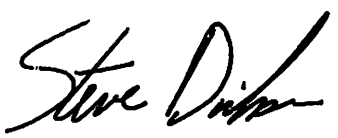
As part of the FAA's continuous operational safety monitoring of the Boeing 787, the FAA asked Boeing to provide information on the cumulative effect of multiple issues that have been reported since the original approval of the Boeing 787 in 2011. Those issues consist of design changes, reports from Boeing about new understandings of certain characteristics of existing aspects of the design, and production quality escapes (the letter included a list of examples of these issues).

The FAA will use information obtained in response to the October 15, 2019, letter to determine whether any corrective action is required. Our objective is to mitigate the risk of fuel-tank explosion due to potential accumulative risks associated with those design changes. The letter did not state a concern that a short-term or urgent safety issue exists in the approved design. The FAA is actively meeting with Boeing to determine the scope and appropriate timeline for this risk assessment effort.

The FAA is committed to ensuring the safety of the flying public by making risk-based decisions using facts and data, as well as lawfully applying our regulations and guidance. I want to emphasize that the FAA is filled at all levels with talented, principled, and dedicated professionals who strive every day for the highest safety standards in aviation. And I want to assure the Committee that I stand behind all of the FAA's people in focusing decisions first and foremost on safety.

Thank you for your continued support of aviation safety. We have sent an identical letter to Chairman Larsen. If you require further assistance, please contact me or Philip Newman, Assistant Administrator for Government and Industry Affairs, at (202) 267-3277.

Sincerely,



Steve Dickson
Administrator

Enclosure

The following lightning protection-related regulations and guidance apply to the Model 787:

14 CFR 25.954, Fuel System Lightning Protection, Amendment 25-14, requires the fuel system be designed and arranged to prevent the ignition of fuel vapor due to lightning. No deviations were requested or granted for this regulation.

FAA Special Conditions (SC) No. 25-414-SC, Lightning Protection of Fuel Tank Structure to Prevent Fuel Tank Vapor Ignition, provides alternative fuel tank structural lightning protection requirements. This standard applies in lieu of § 25.981, Fuel Tank Explosion Prevention, because full compliance was not relevant for lightning aspects of § 25.981.

Issue paper (IP) P-29, Fuel Tank Structural Lightning Protection Means of Compliance for Special Conditions, is the established guidance providing a means of compliance with SC No. 25-414-SC, and is an alternative to the guidance provided in Advisory Circular 25.981-1C, Fuel Tank Ignition Source Prevention Guidelines.

Advisory Circular 20-53B, Protection of Aircraft Fuel Systems Against Vapor Ignition Caused by Lightning. No deviations were requested or granted for this guidance.

FAA Policy ANM-112-08-002, Policy on Issuance of Special Conditions and Exemptions Related to Lightning Protection of Fuel Tank Structure. The FAA and Boeing followed this policy in the development and issuance of SC No. 25-414-SC.

SAE, International Aerospace Recommended Practices (ARP) 5412A, Aircraft Lightning Environment and Related Test Waveforms. No deviations were requested or granted for this guidance.

SAE, International ARP5414A, Aircraft Lightning Zoning. No deviations were requested or granted for this guidance. Boeing later incorporated revision B of this ARP.

The above regulations and guidance were applicable at the time of the original Model 787-8 certification, during the certification of the amended type design for the Models 787-9 and 787-10, and during the certification of numerous post-type-certificate design changes, including the removal of the copper foil from certain wing areas. After the original Model 787-8 type certificate approval, Boeing voluntarily disclosed non-compliances associated with SC No. 25-414-SC in accordance with the process outlined in the ODA Procedures Manual. FAA specialists assessed each non-compliance for its impact to safety and corrective action was taken to address each non-compliance.

FAA Responses to Follow-Up Questions from House T&I Staff

***Question*: For the cert plan list, identify which items were delegated to Boeing and which were retained by the FAA.**

Answer: A list of certification plans is included as Attachment 1.

***Question*: Was MCAS ever activated/engaged during flight tests during the certification process of the 737 MAX aircraft? If so, please identify when this test or specific tests occurred? Please also indicate whether the pilots during these tests were Boeing pilots or FAA pilots?**

Was MCAS ever activated/engaged during flight <u>simulator</u> tests during the certification process of the 737 MAX aircraft? If so, please identify when this test or specific tests occurred? Please also indicate whether the pilots during these tests were Boeing pilots or FAA pilots?

Answer: The Maneuvering Characteristics Augmentation System (MCAS) cannot be independently activated or engaged. MCAS, which is part of the flight control system, is designed to improve handling qualities in wind up turns and stalls, when the flaps are fully retracted and the pilot is manually flying the airplane.

Aggressive maneuvers (wind up turns) and full stalls were flown during Boeing development testing and during FAA certification testing in simulators and in the aircraft, by both Boeing pilots and FAA test pilots. The MCAS function was active during these high angle-of-attack maneuvers. Several dozen FAA certification flights were flown by FAA test pilots in the aircraft between May 2016 and November 2016 to evaluate: Maneuvering Characteristics, Stall Characteristics, Stall Identification and various failure modes of the flight control system, including failures of the speed trim (MCAS) system. In all of these tests, MCAS was active and routinely performing its intended function.

***Question*: How are revisions made to certification documents (e.g., in track changes)?**

Answer: Changes to certification documents are made by Boeing. Documents are revised and noted as Revision A, B, C, and so forth. A log of revisions (Revision Record section) is included in the certification plan noting the section that has been revised, along with a description and date.

***Question*: Do any FAA certification documents include a "dissenting views" section?**

Answer: No. The certification process is an ongoing back and forth process, where the applicant (Boeing in the case of the 737 MAX) must show compliance to FAA regulations and the FAA finds compliance. There is no section in the certification documents labeled or described as "dissenting views." However, the certification documents do record

instances when the FAA and the applicant disagree. The documents also record how the disagreement is ultimately resolved. This can be something as straightforward as the FAA rejecting a test plan or something as complex as agreeing on the applicable regulations and how the applicant plans to show compliance. This is true of all certification programs and especially for large programs like a new airplane or engine.

- Issue Papers do have both FAA and Applicant "positions" and are revised to capture these positions until the Issue Paper is closed. Other certification documents do not contain "views" or positions. The FAA routinely reviews and provides written responses to certification documents for Boeing to evaluate and address. Internal FAA dissenting views are captured on FAA correspondence signature grids, or Issue Paper grids.

- The G-1 Issue Paper documents the positions related to the certification basis development.

- Methods of Compliance, Equivalent Level of Safety, and other technical Issue Papers document positions and include a conclusion that captures Boeing and FAA positions.

- Certification Review Items (CRIs) state FAA's agreement or disagreement with the Boeing position relayed to the Foreign Authority.

- Flight Test Pilot Report, Test Summary provides an area for comments from Pilots.

- Interim and Final Type Board Meeting Notes documents any disagreements voiced in the meeting.

- Formal written rejections of test plans, reports, and certification documents convey problems noted regarding the document.

***Question*: On #6, is it possible to de-dupe emails and group documents by version (i.e., to determine how many unique documents there are)?**

Answer: The FAA is currently implementing a system that we expect will allow deduplication of emails.

***Question*: Are the FSB's sensitive deliberations contained in emails or written comments?**

Answer: Generally, deliberations occur orally, but may also occur through emails or written comments. More specifically, FSB deliberations (sensitive or otherwise) begin at the onset of the certification process. For example, the manufacturer provides general familiarization briefings, which speak to the size, scope, and level of change for the project or system. Oral Q&A occurs and is generally captured by the manufacturer in meeting minutes which the certification project manager and AEG chair have access to through the manufacturer's portal MyBoeingFleet.com. Deliberations continue into Technical Familiarization

Briefings, commonly called "tech-fam" briefings, where the manufacturer gives detailed information about how it will approach the system or changed system certification and in the case of the AEG, any training or pilot procedures. Oral Q&A occurs in the tech-fam meetings, where the manufacturer captures feedback via meeting minutes. The manufacturer then addresses the FSB for training and pilot procedures by submitting the Pilot Qualification Plan (PQP) in which deliberations occur during face-to-face meetings, email, FAA Issue Papers, and are recorded by the manufacturer meeting minutes. There is currently no requirement or process for the FAA FSB to capture meeting minutes, however many FSB chairs do. Lastly, the FAA/AEG documents and communicates important FSB decisions to the manufacturer by transmitting letters to the manufacturer via the certification program manager.

***Question*: On #10, is it possible to pare down the search by date or geographic location?**

Answer: Emails cannot be searched by geographic location, but they can be narrowed down by date.

Date Range	"MCAS" or "AOA Sensors"	("MCAS" OR "AOA Sensors") AND ("Development" OR "testing" OR "fielding" OR "certification")
March 2014-April 25, 2019	592,915	338,074
March 2014-October 29, 2018	234,425	92,265

***Question*: Do Boeing ODA representatives have Boeing email addresses, FAA email addresses, or both?**

Answer: Boeing ODA representatives have Boeing email addresses, not FAA email addresses.

***Question*: For the Certification Plans there were a few items where we could not identify the precise meaning of the acronym. Can you please provide clarification on the following items:**

- **"Avionics – CMU"** *Avionics - Communications Management Unit*
- **"Avionics – IATC"** *This is not an acronym used by the BASOO. Boeing may be able to provide additional clarification.*
- **"Avionics – SECAL"** *This is a typo in the list, intended to be "SELCAL," a portmanteau of "selective calling," which in turn is a function within the CMU.*

- **"Flight Controls – ISFD"** *Flight Controls - Integrated Standby Flight Display*

***Question*: Under the <u>Item column</u> for the Issue Papers there is a dramatic break in the sequence of documents listed. For instance, in the first grouping under "Airframe" it jumps from Item A-1 to Item A-10. In the Environment Systems section it jumps from item ES-2 to item ES-22. I want to clarify that FAA provided us with an entire/complete/full list of <u>ALL ISSUE PAPERS</u> for the 737 MAX, as we had requested? Based on the numbering sequence in the chart you provided it appears many Issue Papers were not included. If that is the case please provide us with the FULL list of ALL Issue Papers. If what you provided is the full list of Issue Papers please provide us with an explanation regarding the numbering sequence in the Item column.**

Answer: An updated list of Issue Papers is included as Attachment 2. As we noted previously, some Issue Papers were not uploaded to the database in a timely manner and therefore were inadvertently omitted from the original list.

However, the numbering system does not indicate missing Issue Papers. Although typically a program will use sequential numbers as much as they can, it is not unusual to have some skipped numbers. A program will start out with a list of possible Issue Papers and they will assign numbers early on. Later, a notional Issue Paper may be determined to be unnecessary after other Issue Papers have already been issued with higher numbers. Also, major certification programs like the 737 MAX reference Issue Papers from other programs through the collector Issue Paper, G-6. We try to avoid assigning the same number multiple times to minimize confusion. That was the case here. The G-6 is a collector that applies many Issue Papers to this program that were previously approved on other programs.

ATTACHMENT 1

Certification Plans

Certification Plan "Level of Involvement" determination retained or delegated by the FAA

Certification Flight Test Plans are evaluated separately.

Key:

Red= FAA Retained "Level of Involvement" determination for individual Certification Plans via Master Certification Plan (Does not indicate compliance findings retained).

Black=Delegated to find compliance

=No applicable plan for the designated model

IPT	System	-8	-9
Reg Admin	Master Certification Plan - Project Level	13117	15050
ALIT	Acoustical	13241	14953
ALIT	Aero - Performance / Flight Manual	13669	15037
ALIT	Aero - Stability and Control		
ALIT	AFM	13242	14954
ALIT	AFHA & DA	13449	15034
ALIT	Cold Operations	13582	15041
ALIT	EASA Volcanic Cloud	16512	16748
ALIT	ETOPS	13671	15038
ALIT	F&R	13581	15040
ALIT	ICA	13580	15039
ALIT	Flutter	13550	15036
ALIT	Loads	13549	15035
ALIT	Sustained Engine Imbalance	13583	15044
ALIT	Weights - Flotation and Ditching Characteristics	13596	15043
ALIT	Weights - Weight and Balance Manual	13595	15042
Airframe	14 CFR/CS 25.795(c)(1) Compliance	15672	15690
Airframe	Airframe (Excluding Loads & Flutter)	12928	14919
Airframe	Bird Strike	14195	14920
Airframe	Systems Structural Substantiation		
Interiors	Insulation	13555	13560
Interiors	Cargo Linings	13556	13561
Interiors	Evacuation Systems		
Interiors	Main Cabin	13557	13562
Interiors	Exterior Markings	13558	13563
Propulsion	Aero - CFM LEAP-1B Exhaust System Performance	13236	14948
Propulsion	Aero - CFM LEAP-1B Thrust Reverser Performance	13235	14947
Propulsion	Aero - Engine Inlet Compatibility	13237	14949
Propulsion	Airplane Unpressurized Fire Safety	13240	14952
Propulsion	Auxiliary Power Unit (APU) Installation & System	13239	14951
Propulsion	Fuel System Installation - Performance, Analysis and Testing	13238	14950
Propulsion	LEAP-1B25 Engine Rating	16136	
Propulsion	LEAP-1B27 Engine Rating	16135	16764
Propulsion	CFM LEAP-1B - Electronic Engine Control	13230	14943
Propulsion	CFM LEAP-1B - Propulsion Operability - Engine Operating Characteristics	13231	14944
Propulsion	CFM LEAP-1B - Engine Performance	13232	14945
Propulsion	Installations - Engine Supplemental Data	13228	14941
Propulsion	Installations - Engine, Nacelle and Component Cooling	13225	14939
Propulsion	Installations - Engine, Nacelle and Strut Fire Safety	13224	14938
Propulsion	Installations – Engine Oil Cooling/Fuel Heating and IDG	13223	14937

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IPT	System	-8	-9
Propulsion	Installations - Uncontained Engine Failure Hazards Analysis (Engine Rotor Burst)	13226	14940
Propulsion	Installations - CFM LEAP-1B Engine - Engine Starting and Ignition	13222	14936
Propulsion	Installations - Fan Cowl Latch & Engine Oil Consumption		
Propulsion	Installations - CFM LEAP-1B Engine – Airplane Emissions	13297	14955
Propulsion	Installations - Engine ETOPS	13229	14942
Propulsion	Structures - Auxiliary Power Unit (APU)	13221	14935
Propulsion	Structures - Nacelle Fan Duct/Thrust Reverser	13087-A	14934
Propulsion	Structures - Nacelle Inlet, Fan Cowl and Primary Exhaust	13086-A	14933
Propulsion	Structures - Pylon	13085	14932
Propulsion	Thrust Reverser System	13234	14946
Systems	Avionics - ADIRU	13486	15013
Systems	Avionics - CVR	13491	15018
Systems	Avionics - CMU	13489	
Systems	Avionics - DFDAU	13484	15011
Systems	Avionics - Displays	13487	15014
Systems	Avionics - EGPWS	13488	15015
Systems	Avionics - FMCS	13482	15009
Systems	Avionics - Flight Deck Audio		
Systems	Avionics - HF/VHF Communication		
Systems	Avionics - IATC		
Systems	Avionics - Radio Navigation Systems	13490	15017
Systems	Avionics - SATCOM		
Systems	Avionics - SECAL		
Systems	Avionics - SMYD	13483	15010
Systems	Avionics - TCAS/ATC	13492	15019
Systems	Avionics - WXR (Honeywell)	13496	15021
Systems	Avionics - WXR (Rockwell Collins)		15012
Systems	Electrical - EPS	13462	14990
Systems	Electrical - EMC (Airplane Level)	13466	15028
Systems	Electrical - Exterior & Service Lighting	13463	14991
Systems	Electrical - HIRF (Airplane Level)	13467	14995
Systems	Electrical – IDG	13495	14992
Systems	Electrical - Lightning (Airplane Level)	13468	14996
Systems	Electrical - PSEU	13461	14989
Systems	Electrical - P-Static (Airplane Level)	13469	14997
Systems	Electrical - EWIS	13465	14994
Systems	Electronic Systems - Network Cyber Security	13498	15027
Systems	Electronic Systems - Onboard Network System	13497	15026
Systems	ECS - Air Conditioning	13458	14985
Systems	ECS - Cabin Pressure Control / Cabin Altitude	13453	14980

ATTACHMENT 1

Certification Plans

Certification Plan "Level of Involvement" determination retained or delegated by the FAA

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Key:

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Black=Delegated to find compliance

=No applicable plan for the designated model

IPT	System	-8	-9
Systems	ECS - Ram Air System		
Systems	ECS - Air Supply Control System (Pneu/Bleed System)	13459	14986
Systems	ECS - Duct Leak Overheat Detection		
Systems	ECS - Ice / Rain Protection	13456	14983
Systems	ECS - Nitrogen Generation System	13460	14987
Systems	ECS - Wheel Well Fire Protection	13502	14988
Systems	ECS - Air Distribution/EE Cooling	13454	14981
Systems	ECS - Decompression	13455	14982
Systems	ECS - Cargo Fire Protection	13457	14984
Systems	ECS - Galley Ventilation		
Systems	Flight Controls - Autoflight (EDFCS/FCC) & Autothrottle	13474	15002
Systems	Flight Controls - Flight Deck Instruments	13494	15003
Systems	Flight Controls - High Lift	13473	15001
Systems	Flight Controls - Primary, Elevator and Stablizer Control	13471	14999
Systems	Flight Controls - Primary, Lateral Control	13470	14998
Systems	Flight Controls - Primary, Rudder Control	13472	15000
Systems	Flight Controls - ISFD		
Systems	Flight Crew Operations Integration	13464	14993
Systems	Flight Deck - Ballistic & Intrusion Installations	13480	15008
Systems	Flight Deck – Flight Deck Panel Installations	13478	15006
Systems	Flight Deck - Heads up Display (HUD) Provisions	13476	15004
Systems	Flight Deck - Misc & Emergency Equipment Installations	13477	15005
Systems	Flight Deck - Secondary Support Structure Installations	13479	15007
Systems	Mech/Hyd - Hydraulics	13450	14977
Systems	Mech/Hyd - Landing Gear Systems /Wheels-Tires-Brakes	13451	14978
Systems	Mech/Hyd - Tire and Brake Monitoring System	14654	
Systems	Mech/Hyd - Tire Threats	13452	14979

	Project Quantity of CPs/Deliverables	93	91

As a note of clarification:

The numbers in the list are the Boeing generated numbers used for each of the Boeing certification plans. If there is a pattern to these numbers, we are not aware of it.

For example, 13117 is:

"Submittal of Master Certification Plan 13117 for PS12-0038, '737-8 Amended Type Certification Plan – Master Certification Plan – Project Level,' Revision A"

ATTACHMENT 2

737 Max Issue Papers by Focus

Applicant	Model	Item	IP Date	Issue Paper Subject	ELOS	Stage
		Airframe				
Boeing Commercial Airplanes	737-7, 737-8, 737-9	A-1	3/16/2015	Flutter Following Loss of a Winglet	No	4
Boeing	737-7, 737-8, 737-9	A-2	2/9/2016	Sustained Engine Imbalance	No	4
The Boeing Company	737-7, 737-8, 737-9, 767-2C, 777-9, 787-10	A-8	10/1/2015	Discrete Source Damage for Uncontained Engine Failure	No	4
Boeing Commercial Airplanes	737-7, 737-8, 737-9	A-9	9/15/2015	Design Roll Maneuver Requirement	No	4
Boeing	737-7, 737-8, 737-8200, 737-9, 737-10	A-10	8/21/2018	Damage Tolerance and Fatigue Evaluation of Structure	Yes	4
		Crashworthiness / Interiors				
The Boeing Company	737-7, 737-8, 737-9	C-1	9/11/2014	Unplanned Ditching Requirements	No	4
The Boeing Company	737, 747, 767, 777, 787 series	C-1 **	11/18/2015	Flammability Requirements of Cargo Liners for Transport Category Airplanes **Note that there are two C-1 Issue Papers but one of them (Flammability Requirements of Cargo Liners) is a cross model issue paper which covers more than just the 737Max Model.	No	4
The Boeing Company	737-7, 737-8, 737-9	C-2	7/14/2014	Direct View Requirement	No	4
The Boeing Company	777, 787, 747, 767, 737 series	C-5	9/14/2016	Flammability Testing Hierarchy	Yes	4
		ETOPS				
The Boeing Company	737-7, 737-8, 737-8	EE-1	2/18/2016	Airplane System Functions Required for a Maximum Length Extended Operations (ETOPS) Diversion	No	4
Boeing	737-7, 737-8, 737-9	EE-2	7/10/2015	Icing Environmental Conditions, Icing Exposure and Ice Shapes for a Maximum Length Extended Operations (ETOPS) Diversion	No	4
The Boeing Company	737-7, 737-8, 737-9	EE-3	7/3/2017	Extended Operations (ETOPS) Acceptance Criteria Design Maturity and Reliability Methods	No	4
		Environmental Systems				
The Boeing Company	737-700, 737-700C, 737-800, 737-900, 737-900ER, 737-7, 737-8, 737-9	ES-1	4/16/2014	Crew Determination of the Quantity of Oxygen Available in the Lavatory Passenger Service Units Bottles	Yes	4
Boeing	737-7, 737-8, 737-9	ES-2	11/20/2015	Electrical/Electronic Equipment Fire Detection and Smoke Penetration	No	4
Boeing Commercial Airplanes	737-7, 737-8, 737-9	ES-3	3/1/2016	Fire Detection, Smoke Penetration & Cockpit Smoke Evacuation During Airplane Operations with Air Conditioning Packs-Off	No	4
Boeing	737-7, 737-8, 737-9	ES-4	4/22/2016	Ventilation System Airflow Rate	No	4
Boeing	737-7, 737-8, 737-9, 777-9, 787-10	ES-7	1/11/2015	Flight Deck Toxicity Levels Following Fire Extinguisher Discharge	No	4
Boeing Commercial Airplanes	737-600, 737-700, 737-700C, 737-800, 737-900, 737-900ER, 737-7, 737-8, 737-9, 777-300ER, 777-9, 787-10	ES-22	2/16/2017	Boeing Portable Oxygen Equipment Applicable Regulations and Method of Compliance	No	4
		Flight Test				
The Boeing Company	737-7, 737-8, 737-9	F-2	10/28/2014	Longitudinal Trim	Yes	4
The Boeing Company	737-7, 737-8, 737-9	F-3	11/19/2014	En Route Climb Speed	No	4
Boeing Commercial Airplanes	737-7, 737-8, 737-9	F-5	1/31/2017	Return Landing Capability	No	4
Boeing	737-8, 737-7, 737-9	F-6	5/20/2016	Standby Air Data System	No	4
Boeing Commercial Airplanes	Boeing 767-2C, Boeing 737-7, Boeing 737-8, Boeing 737-9	F-7	9/29/2015	Effect of Deicing and Anti-icing Fluid on Aerodynamics and Systems	No	4
Boeing Commercial Airplanes	737-7, 737-8, 737-9	F-8	7/13/2016	Narrow Runway Operations	No	4
		General				
Boeing Commercial Airplanes	737-8	G-1	10/15/2018	Cert Basis	No	4
Boeing Commercial Airplanes	737-9	G-1	10/16/2018	Cert Basis	No	4
Boeing Commercial Airplanes	737-7, 737-8, 737-9, 737-10, 737-8200	G-2	7/27/2017	Determination of Compliance	No	4
Boeing Commercial Airplanes	737-7, 737-8, 737-9	G-6	10/25/2016	Boeing Model 737-7,-8, -9 – Usage of Previously Applied Issue Papers and Policy Guidance Material	Yes	4
The Boeing Company	787-8, 737-9, 747-8, 747-8F, 737-600, 737-700, 737-700C, 737-800, 737-900, 737-900ER, 737-7, 737-8, 737-9, 767-200, 767-300, 767-300F, 767-400ER, 767-2C, 777-200, 777-300, 777-300ER, 777-200LR, 777-8, 777-9, 777F	G-8	4/27/2016	Inclusion of Airworthiness Limitations within the Boeing ICA Manuals	Yes	4

ATTACHMENT 2

737 Max Issue Papers by Focus

Applicant	Model	Item	IP Date	Issue Paper Subject	ELOS	Stage
		Maintenance				
The Boeing Company	737-7, 737-8, 737-9	M-1	11/13/2014	Instructions for Continued Airworthiness and Maintenance Review Board (MRB) Report	No	4
The Boeing Company	737-7, 737-8, 737-9	M-2	9/9/2014	Evaluation and Validation of ETOPS Instructions for Continued Airworthiness	No	4
The Boeing Company	737-7, 737-8, 737-9	M-3	3/25/2015	Lightning and High Intensity Radiated Fields (LHIRF) Protection Maintenance	No	4
		Operational				
The Boeing Company	737-7, 737-8, 737-9	O-1	1/26/2016	Type Rating Determination and 14 CFR Training Reqirements	No	4
The Boeing Company	737-7, 737-8, 737-9	O-2	5/20/2015	Operational Acceptability	No	4
The Boeing Company	737-7, 737-8, 737-9	O-3	7/18/2014	Forward Observer's Seat and Associated Systems	No	4
The Boeing Company	737-7, 737-8, 737-9	O-4	1/31/2014	Master Minimum Equipment List (MMEL)	No	4
The Boeing Company	737-7, 737-8, 737-9	O-5	7/18/2014	Training Simulator	No	4
The Boeing Company	737-7, 737-8, 737-9	O-6	7/18/2014	Operational Evaluation	No	4
		Propulsion				
The Boeing Company	737-7, 737-8, 737-9	P-1	12/4/2017	In-Flight All-Engines Restart	No	4
The Boeing Company	737-7, 737-8, 737-9	P-3	1/31/2014	Auxiliary Power Unit Installation (APU) - Flight Deck Indications and Operation as an Alterternate Electrical Power Source	Yes	4
The Boeing Company	737-7, 737-8, 737-9	P-4	1/22/2014	Auxiliary Power Unit Installation (APU) - Operating Limitations and Instrument Markings	Yes	4
The Boeing Company	737-7, 737-8, 737-9	P-6	11/23/2016	Uncontrollable High Engine Thrust	No	4
Boeing	Boeing 737-7, Boeing 737-8, Boeing 737-9	P-7	11/9/2016	Fueling Float Switch Installation	Yes	4
Boeing	737-8, 737-7, 737-9	P-8	4/15/2016	Fire Proof Cowling and Nacelle Skin	No	4
The Boeing Company	737-7, 737-8, 737-9	P-10	6/26/2017	Fire Protection of Surfaces to the Rear of the Engine Nacelles	No	4
The Boeing Company	737-7, 737-8, 737-9	P-12	8/6/2014	Fire Protection of Wing Leading Edge Slat Wedge	Yes	4
The Boeing Company	737-7, 737-8, 737-9	P-13	8/21/2015	Fan Compartment Fire Zone Fire Analysis	No	4
The Boeing Company	737-7, 737-8, 737-8	P-14	11/23/2016	Fuel Filter Location	Yes	4
The Boeing Company	737-7, 737-8, 737-9	P-15	7/30/2014	Uncontained Engine Failure – Risk Analysis Assumptions	No	4
The Boeing Company	737-7, 737-8, 737-9	P-16	4/30/2015	Display of Powerplant Instruments	Yes	4
The Boeing Company	737-7, 737-8, 737-9	P-18	5/29/2015	Flammable Fluid Carrying Components in Nacelle Areas Behind the Firewall	Yes	4
The Boeing Company	737-7, 737-8, 737-9	P-19	11/14/2016	Fuel Tank Ignition Prevention - Hot Surface Ignition Temperature	Yes	4
The Boeing Company	737-7, 737-8, 737-9	P-20	3/16/2015	Engine Aft Fairing and Main Strut Fire Safety Requirements	Yes	4
The Boeing Company	737-8, 737-9, 737-7	P-21	5/17/2016	Use of HFC-125 to Simulate Halon 1301	No	4
The Boeing Company	737-7, 737-8, 737-9	P-22	3/17/2017	Flammable Fluid Fire Protection	No	4
The Boeing Company	737-7, 737-8, 737-9	P-23	2/18/2015	Fire Extinguishing Plumbing and Wiring Connections	No	4
The Boeing Company	737-7, 737-8, 737-9	P-27	10/24/2016	Turbine Engine Installation Icing Compliance	No	4
The Boeing Company	737-7, 737-8, 737-9, 767-2C	P-28	6/7/2016	Airplane Fueling Electrostatics	No	4
The Boeing Company	737-7, 737-8, 737-9	P-29	10/16/2016	Fireproof Requirements for the Auxiliary Power Unit (APU) Mount System	Yes	4
The Boeing Company	737-8, 737-9, 737-7	P-32	11/23/2016	Fire Testing of Sealants	Yes	4
The Boeing Company	737-7, 737-8, 737-9	P-34	1/20/2017	Residual Flames during Powerplant Component Fire Testing	No	4
The Boeing Company	737-7, 737-8, 737-9, 737-10, 737-8200	P-35	2/13/2018	Fan Compartment Ventilation Rate	No	4
		Systems and Equipment				
Boeing	737-7, 737-8, 737-9	S-2	9/15/2015	Cabin Altitude Warning System - Dual Limits Operation into High Altitude Airports	Yes	4

ATTACHMENT 2

737 Max Issue Papers by Focus

Applicant	Model	Item	IP Date	Issue Paper Subject	ELOS	Stage
Systems Avionics						
Boeing	737-7, 737-8, 737-9	SA-02	1/11/2017	Flightcrew Alerting	No	4
Boeing	737-7, 737-8, 737-9	SA-1	3/19/2015	Development Assurance Process	No	4
The Boeing Company	737-7, 737-8, 737-9	SA-2	1/11/2017	Flightcrew Alerting	No	4
The Boeing Company	737-7, 737-8, 737-9	SA-3	2/18/2014	737 Aircraft Electronic System Protection from unauthorized External Access	No	4
The Boeing Company	737-7, 737-8, 737-9	SA-4	2/18/2014	737 Isolation or Aircraft Electronic System Security Proection from Unauthorized Internal Access	No	4
Boeing	737-8, 737-9, 737-7	SA-5	7/11/2016	GNSS Landing System (GLS) Compliance Requirements for Category I Approach, Autoland and Rollout Operations	No	4
The Boeing Company	737-7, 737-8, 737-9, 767-2C	SA-6	6/30/2015	Multi Core Microprocessors	No	4
The Boeing Company	737-7, 737-8, 737-9	SA-7	7/25/2014	Commercial Off-The-Shelf (COTS) Processors	No	4
Boeing Commercial Airplanes	737-7, 737-8, 737-9, 737-600, 737-700, 737-800, 737-900	SA-8	12/10/2015	Runway Overrun Prevention System	No	4
Systems Electrical						
Boeing	737-7, 737-8, 737-9	SE-1	1/3/2014	Demonstrating Airplane Tolerance to Portable Electronic Devices (PEDs)	No	4
Boeing Commercial Airplanes	Boeing 767-2C, Boeing 737-7, Boeing 737-8, Boeing 737-9	SE-2	6/10/2015	Installed Non-Rechargeable Lithium Batteries and Battery Systems	No	4
Boeing	737-7, 737-8, 737-9	SE-3	4/18/2016	Installed Rechargeable Lithium Batteries Special Conditions	No	4
Boeing	737-7, 737-8, 737-9	SE-4	4/21/2016	Installed Rechargeable Lithium Batteries and Battery Systems	No	4
The Boeing Company	737-7, 737-8, 737-9	SE-5	12/15/2015	Demonstration of Compliance for Emergency Lighting Installations	No	4
Boeing Commercial Airplanes	Boeing 767-2C, Boeing 737-7, Boeing 737-8, Boeing 737-9	SE-6	10/30/2015	Non-Rechargeable Lithium Batteries Special Conditions	No	4
Boeing Commercial Airplanes	767-2C, 737-7, 737-8, 737-9	SE-7	3/14/2018	Non-Rechargeable Lithium Batteries Means of Compliance	No	4
The Boeing Company	737-7, 737-8, 737-9 (737 MAX), 787-9, 787-10	SE-11	3/14/2018	Engine Electrical Wiring Interconnection System (EWIS) - Fire Protection	Yes	4
Systems Flight Controls						
Boeing	737-7, 737-8, 737-9	SF-1	7/24/2015	Engine Rotor Burst and Rudder Mechanical Flight Control Cables	No	4
The Boeing Company	737-9 only	SF-2	10/8/2015	Boltless Wheels	No	4
Boeing	737-8, 737-7, 737-9	SF-3	3/8/2016	Flight Control Jams	No	4
The Boeing Company	737-7, 737-8, 737-9	SF-4	2/2/2016	Yaw Oscillations	No	4
Systems Hardware						
The Boeing Company	737-7, 737-8, 737-9	SH-1a	1/7/2015	Guidance for the Assurance of Airborne Electronic Hardware Devices	No	4
The Boeing Company	737-7, 737-8, 737-9	SH-2a	11/25/2014	Oversight of Suppliers of Airborne Systems and Equipment containing Airborne Electronic Hardware	No	4
The Boeing Company	737-7, 737-8, 737-9	SH-3	3/24/2016	Commercial Off The Shelf (COTS) Intellectual Property (IP) used to program Programmable Logic Devices (PLD) and Application Specific Integrated Circuits (ASIC)	No	4
Systems Software						
The Boeing Company	737-7, 737-8, 737-9	SW-1a	7/22/2014	Software Aspects of Airborne Systems and Equipment Certification	No	4
The Boeing Company	737-7, 737-8, 737-9	SW-8a	8/22/2014	Use of Model-Based Development (MBD) Methods and Tools	No	4

FAA Responses to Follow-Up Questions from House T&I Staff

***Question*: On the FSB deliberations the answers to our suggestions implied that the "meeting minutes" are maintained by Boeing in the MyBoeingFleet.com portal. Does the FAA intend to provide these "meeting minutes" to us as part of our records request? Does the FAA also maintain separate copies of the FSB deliberations or are all of these records maintained by Boeing?**

> *Answer*: These records are normally recorded and kept by the applicant. However, the FAA is in the process of identifying and producing documents responsive to the Committee's April 1 letter, including FSB communications and documents in our custody.

***Question*: In the response to this same question about the FSB, you mentioned that the FAA/AEG communicates important FSB decisions to the manufacturer by transmitting letters to the manufacturer via the "certification program manager." Number one, I am assuming all of that correspondence will be captured and provided in response to the records request, but please confirm that with us.**

Number two, can you please provide a list of every "certification program manager" for the 737 MAX from the inception of the program to present. This should include all managers whether they are currently with the FAA or not.

> *Answer*: The FAA is in the process of identifying and producing documents responsive to Question 6 in the Committee's April 1 letter, including communications between the certification program manager, the FSB Chair, and the manufacturer. There has been only one certification program manager (sometimes called the project manager or PM) for the 737 MAX and that position is located in the BASOO. Most projects have only one designated PM.

***Question*: Regarding the list of Certification Plans there is a line that says: "Certification Flight Test Plans are evaluated separately." Please provide us with a complete list of the "Certification Flight Test Plans" for the 737 MAX.**

> *Answer*: The Flight Test Certification Reports provided to the Committee on June 28, 2019, refer to the Certification Flight Test Plans (e.g., FAA-DEFAZIO-003965 through FAA-DEFAZIO-004425).

***Question*: On the Issue Papers, some citations are in black ink and some are in red ink. What does the black ink designate and what does the red ink designate?**

> *Answer*: Red indicates an update to the list.

***Question:* How much time was required for "differences training" for the 737 MAX? I recall seeing news reports of 90 minutes for computer based training, but I don't believe I've seen any official FAA document citing that or any other specific number. Can you get**

me a definitive answer regarding the length of differences training that the FAA required for the MAX?

Answer: The FAA required differences training which qualifies a 737NG pilot to be able to fly the MAX, and did not specify a time requirement. The FAA mandates required training and checking elements for the carriers to develop the training and submit for FAA approval, which is based on specific criteria identified in an operational evaluation. Since each carrier's training program is unique, the amount of time for a pilot to complete the training and validation may vary. Boeing developed a proposed module for differences training which was evaluated by the FAA, and is estimated to take approximately 2 hours to complete.

Federal Aviation Administration (FAA)
Aviation Safety Organization (AVS)
Safety Culture Assessment Report

DRAFT

February 28, 2020

MITRE

Table of Contents

1. Executive Summary

Executive Summary: Background

Safety culture briefly defined as *'the way we do things around here.'*

Context

MITRE's assessment of the AVS safety culture comes during a time when FAA is under significant pressure due to recent Boeing 737 Max crashes, and is experiencing significant organizational change – from ongoing reorganizations, leadership changes, a new compliance program, and a workforce still adjusting to a bolstered role for industry to oversee and assure the safety of its products and operations.

Mandate

AVS leadership requested that The MITRE Corporation conduct an independent assessment of its safety culture and provide recommendations to sustain and strengthen it. In addition, AVS leadership requested MITRE to collect input from individuals across AVS on how to shape and implement a new Voluntary Safety Reporting Program (VSRP) to maximize its impact and value.

Timeframe and Approach

Over a period of five months (October 2019-February 2020), MITRE worked to obtain first-hand information, data, and insight from AVS stakeholders, analyze the data, and draft this report. Input included:

- Interviews with 17 AVS executives and labor leaders focused on AVS's current safety culture, and VSRP vision and "must haves"
- Survey of 7,147 AVS employees and managers, which measured 10 critical dimensions of a safety culture, with a 25% response rate
- 25 focus groups with 93 AVS employees and managers in six different locations, all who were randomly selected and participated voluntarily
- Interviews with three external organizations that shared their leading practices for establishing and sustaining a safety culture

Executive Summary: Key Findings (1 of 3)

The Safety Culture Assessment led to key findings that are organized around three categories: **VSRP, AVS Safety Culture Enablers**, and **AVS Safety Culture Barriers.**

VSRP

- Some employees shared that a VSRP could be a useful backstop in situations where issues reported to their front-line managers are not addressed, while others expressed concerns about what is perceived as duplicative safety reporting programs and questioned why a new one is needed.
- Many enthusiastically provided input on what would be required to make a new VSRP successful, covering topics such as the need for anonymity, neutrality of the investigation team, importance of feedback, and need for clarity on what type of issues should be reported.
- Managers shared concerns that a new VSRP may increase their workloads and lead to wasted time and resources, particularly if they are required to investigate newly reported issues, many of which are expected to be frivolous.
- There were several suggestions for successfully rolling out and maintaining the VSRP including ensuring visible commitment from senior leadership, developing a communication/marketing plan which defines the vision for the VSRP, providing appropriate training, and having dedicated resources to maintain the program.

AVS Safety Culture Enablers

- The FAA workforce is passionate and committed to aviation safety.
- Front-line managers are viewed as providing strong support for safety (e.g., listen to and address employee safety concerns, provide support to employees when making safety-related decisions).
- Employees appreciate that the FAA Administrator is visibly demonstrating a commitment to safety.

Executive Summary: Key Findings (2 of 3)

AVS Safety Culture Barriers

- **Senior Leadership.** While Headquarters staff expressed that AVS has a strong commitment to safety, those in the field expressed much more concern that AVS senior leadership in Washington DC is not reinforcing a culture that puts safety first. Many believe that AVS senior leaders are overly concerned with achieving the business-oriented outcomes of industry stakeholders and are not held accountable for safety-related decisions.

- **Industry Pressure.** Employees and managers reported that external pressure from industry is strong and is impacting the AVS safety culture. They shared that there is an unwritten code to be more "liberal-minded" (versus conservative) when assessing safety risks, and there is pressure to find win-win solutions that benefit industry. Many reported that industry will escalate issues to senior leadership and/or Congress if FAA employees are perceived as "getting in their way," which directly leads to decisions that are friendlier to industry (i.e., to help meet timelines and manage costs of industry applicants and operators). How senior leadership responds to industry pressure leads to employee distrust.

- **Trust.** Some technical experts in the field don't feel their judgement is respected, as their data-driven safety recommendations are sometimes not followed for reasons that are unclear to them, resulting in a sense of demoralization. Some managers reported that this could partly be alleviated by improving communications and better explaining the rationale behind decisions.

- **Just Culture.** The majority of survey respondents (69%) agreed that they are comfortable reporting safety issues/concerns. While employees generally report that *formal* retribution in response to reporting a safety concern is extremely rare, many believe that they will suffer *subtle but obvious* consequences if they raise safety issues too frequently and if they perform their jobs in a way that is perceived by management as being overly cautious. Consequences can range from lost promotions to new (unwanted) assignments to simply being treated differently.

Executive Summary: Key Findings (3 of 3)

- **Talent Management.** Human capital challenges negatively impact the safety culture, which include staffing shortages, over-burdening technical experts with administrative duties, extensive use of acting managers, skill and training gaps, challenges with hiring and retaining key staff, and more.

- **Delegation Authority and FAA's Role.** There is a general concern that the FAA - under Title 49 of the United States Code (49 USC) 44702(d) - has delegated too much authority to industry which negatively impacts the safety of the National Airspace. A large percentage of survey respondents (43%) disagreed that FAA appropriately delegates certification activities to organizations and individual designees external to FAA. Many focus group participants believe that the Organization Designation Authorization (ODA) Model is causing FAA to move further away from its safety mission and results in confusion about the FAA's roles. Additionally, there is a perception that the AVS staffing model is not aligned to drive safety outcomes in the ODA Model.

Key Takeaway

AVS senior leadership's response to and management of industry pressure is at the heart of the organization's core safety culture challenges: lack of trust, inconsistent accountability, FAA role confusion, and the perception that AVS is moving further away from its safety mission.

2. Background and Approach

Objectives of Safety Culture Assessment

Key Outcomes for Long-Term Impact

AVS will sustain and strengthen the safety culture throughout the organization by:

- Promoting new and existing behaviors and practices that further develop a "Just Culture"
- Pursuing actions to identify and address safety issues and concerns
- Intervening earlier and proactively to mitigate safety risks

Objectives

Conduct Current State Assessment of AVS's Safety Culture and Identify Leading Practices

- Identify organizational enablers and barriers to an AVS safety culture and Voluntary Safety Reporting Program (VSRP)
- Create an AVS-wide baseline for tracking progress over time in strengthening AVS's safety culture
- Document leading practices in safety culture and internal and external safety reporting programs

Provide Recommendations to Sustain and Strengthen the AVS Safety Culture

- Considerations for shaping and implementing the VSRP to maximize the value
- Organizational levers for sustaining and strengthening the safety culture (e.g., culture, resource allocation, processes, leadership practices/training, communication, talent management, risk management/mitigation practices)

AVS Safety Culture Assessment: Data Collection

Interviews

Interviews with AVS executives and labor leaders to:
-Provide input for assessing the current state of AVS's culture
-Provide vision and "must haves" for the new VSRP
-Review and provide feedback on AVS Safety Culture Survey

Safety Culture Survey

Online survey for all AVS employees to:
-Identify culture enablers and barriers to a successful VSRP
-Create a baseline for tracking progress in strengthening AVS's safety culture

Focus Groups

Focus groups with employees in multiple AVS locations to:
-Dig deeper into survey results (identify "root causes")
-Identify internal best practices in safety culture
-Solicit employee suggestions for improving the safety culture
-Provide considerations for designing and rolling out the new VSRP

Document Review and Research

Review AVS documents and safety culture and reporting research to:
-Identify topics for safety culture survey
-Identify leading practices for safety culture and safety reporting programs

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Stakeholder Interview Approach and Participants

- To kick off the project, MITRE conducted interviews with 17 stakeholders, including AVS executives and labor leaders.
- Feedback from stakeholders was categorized into five topic areas:
  - **Vision** for AVS Safety Culture
  - **Desired Attributes** for an AVS VSRP
  - Current **Organizational Enablers** of a VSRP and a strong safety culture
  - Potential **Organizational Barriers** to a VSRP and a strong safety culture
  - **Suggestions** for successfully implementing AVS's VSRP

Organizations Interviewed

- Office of the Associate Administrator for Aviation Safety
- Office of Accident Investigation and Prevention
- Office of Aerospace Medicine
- Air Traffic Safety Oversight Service
- Aircraft Certification Service
- Flight Standards Service
- Office of Quality, Integration and Executive Services
- Office of Rulemaking
- UAS Integration Office
- Professional Aviation Safety Specialists (PASS)
- American Federation of State, County and Municipal Employees (AFSCME)

Survey Approach

MITRE used a rigorous, proven methodology to develop the AVS Safety Culture Survey, measuring 10 critical dimensions of a safety culture.

Literature Review

- Evaluated over 20 key safety culture studies and industry papers, including leading practices in aviation safety, to identify the critical elements of a strong safety culture
- Reviewed safety culture surveys to identify relevant and proven questions

Stakeholder Input

- Interviews with AVS executives
- Interviews with labor leaders
- Feedback from AVS VSRP Matrix Team

MITRE Team Experience

- Survey research
- Qualitative research
- Culture assessment
- Safety

AVS Safety Culture Survey

10 Safety Culture Dimensions

- ❑ Leadership Commitment to Safety
- ❑ Front-Line Manager Support for Safety
- ❑ Open Communication
- ❑ Reporting and Just Culture
- ❑ Continuous Learning
- ❑ Training and Resources
- ❑ Safety Policies and Procedures
- ❑ Safety Accountability
- ❑ External Influence
- ❑ Collaboration

Survey Response Rates: Overall and by Service/Office

- The Safety Culture Survey was administered online to all AVS employees and managers (a total of 7,147) from **November 20 to December 9.**
- The overall response rate was **25%.** [Based on the number of completed surveys, the 95% confidence interval for AVS-wide survey results is approximately +/- 2 percentage points.]
- Survey results can serve as a baseline for overall AVS-wide results. However, results for some individual Services/Offices should be interpreted with caution (e.g., due to small sample sizes).

Service/Office	Number Invited	Number of Responses	Response Rate
AVS Overall	**7,147**	**1814**	**25%**
Office of the Associate Administrator for Aviation Safety*	9	70	NA*
Office of Accident Investigation and Prevention (AVP)**	77	22	29%
Office of Aerospace Medicine (AAM)	465	62	13%
Air Traffic Safety Oversight Service (AOV)**	125	22	18%
Aircraft Certification Service (AIR)	1311	373	28%
Flight Standards Service (FS)	4957	1029	21%
Office of Quality, Integration, and Executive Services (AQS)**	69	18	26%
Office of Rulemaking (ARM)***	34	3	9%
UAS Integration Office (AUS)**	100	15	15%
Missing (Respondents that did not identify their Service/Office in the survey	NA	200	NA

*61 respondents mistakenly identified the Office of the Associate Administrator for Aviation Safety as their place of work, distorting the response rate.

**Due to their small sample size, there is less confidence in the results for these Services/Offices.

*** Results are not provided for ARM because less than 10 individuals from ARM responded to the survey.

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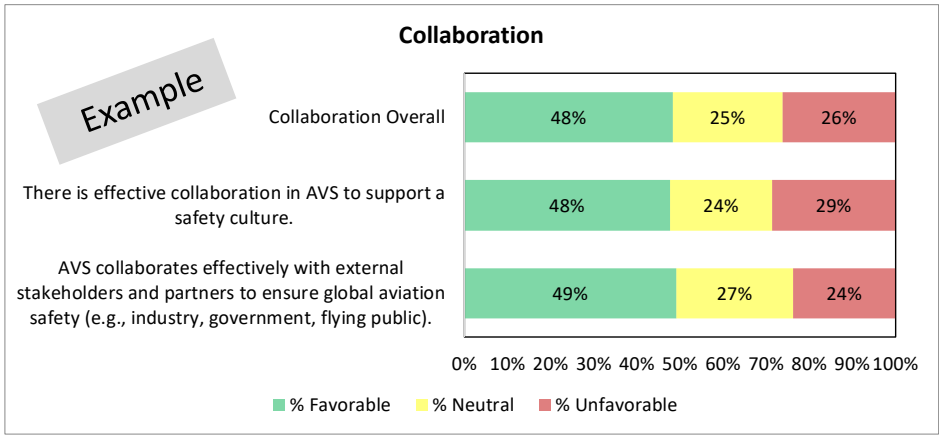
Survey Analysis

- For each survey dimension and question, frequency distributions were calculated -- showing the percent of favorable, neutral, and unfavorable responses for AVS as a whole, and each Service/Office, level, and tenure group.
  - **Favorable response:** The percent of respondents who **"strongly agreed"** or **"agreed"** with the statement
  - **Neutral response:** The percent of respondents who **"neither agreed nor disagreed"** with the statement
  - **Unfavorable response**: The percent of respondents who **"strongly disagreed"** or **"disagreed"** with the statement



- The survey also included one open-ended question: *If you could do one thing to strengthen the safety culture, what would it be?*
  - There were 966 comments in response to the open-ended question.
  - Key themes were identified through a text-mining topic-modeling process and subject matter expert review.

Please see the report entitled Aviation Safety Organization (AVS) Safety Culture Survey Findings for the detailed survey results (AVS-wide, Service/Office results, results by level and tenure).

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Focus Group Approach

- In **January 2020**, MITRE conducted **25 focus groups** with employees, Front-Line Managers, and Senior/Middle Managers from across Services/Offices in the following **six locations**:
  - Atlanta (College Park, GA)
  - Dallas (Fort Worth, TX)
  - Seattle (Des Moines, WA)
  - New York (Jamaica, NY)
  - Boston (Burlington, MA)
  - Washington, DC
- Focus group participants were **randomly selected**, and participation was **voluntary.**
- A total of **55 employees**, **18 Front-Line Managers**, and **20 Middle and Senior Managers** participated.
- Focus group topics, shown at right, were intended to **build upon survey and interview findings** and further explore **organizational strengths and opportunities for strengthening the safety culture and successfully implementing the new VSRP.**

Focus Group Topic Areas

- Experience with and Desired attributes of VSRP
- Barriers and Enablers to a Safety Culture and Safety Reporting
- Leadership Commitment to Safety and Accountability
- Trust and Reporting
- Training and Communications
- Staffing and Resources
- Collaboration
- External Pressure

Focus Group Participation by Level and Service/Office

Position	Employees	Front-Line Managers	Middle and Senior Managers	*Total*
Location				
Atlanta	7	1	4	*12*
Dallas	11	3	3	*17*
Seattle	13	4	7	*24*
New York	2	1	4	*7*
Boston	6	7	0	*13*
Washington DC	16	2	2	*20*
Total	*55*	*18*	*20*	*93*

A total of 93 employees and managers participated in the 25 90-minute focus group sessions

Service/Office	AVP	AAM	AOV	AIR	FS	AQS	ARM	AUS
Location								
Atlanta	0	1	0	4	7	0	0	0
Dallas	0	1	0	8	8	0	0	0
Seattle	0	1	0	18	5	0	0	0
New York	1	1	0	2	3	0	0	0
Boston	1	0	0	7	5	0	0	0
Washington DC	2	0	4	3	5	4	1	1
Total	*4*	*4*	*4*	*42*	*33*	*4*	*1*	*1*

AIR and FS had the highest representation in the focus groups.

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Document Review and Research

- MITRE reviewed AVS documents to provide context on existing safety reporting programs and understand the requirements of the VSRP that were defined by the VSRP Matrix Team.
- To identify leading practices, MITRE:
  - Conducted interviews with three high-performing organizations with a strong safety culture to identify leading practices for safety culture and safety reporting programs
  - Reviewed seminal reports highlighting safety culture challenges and leading practices (*NASA Columbia Accident Investigation Board Report*, *NASA/Navy Benchmarking Exchange (NNBE)*
- Promising practices that were identified are highlighted throughout the report.

Leading Practice Participants

- General Motors Corporation
- Large automotive company
- Retired SES, Naval Reactor Programs

Interview Topics

- Value of VSRP
- Governance process for VSRP
- Resources committed to VSRP
- Critical success factors for VSRP
- Strategy for rolling out the VSRP
- Safety culture enablers and barriers

3. Overview of Safety Culture Assessment Findings

Overview of Key Findings

- Safety Culture Assessment Findings are organized around **three categories.**
- Safety Culture **Enablers** and **Barriers** findings are aligned with the **dimensions of the AVS Safety Culture Survey.**

VSRP

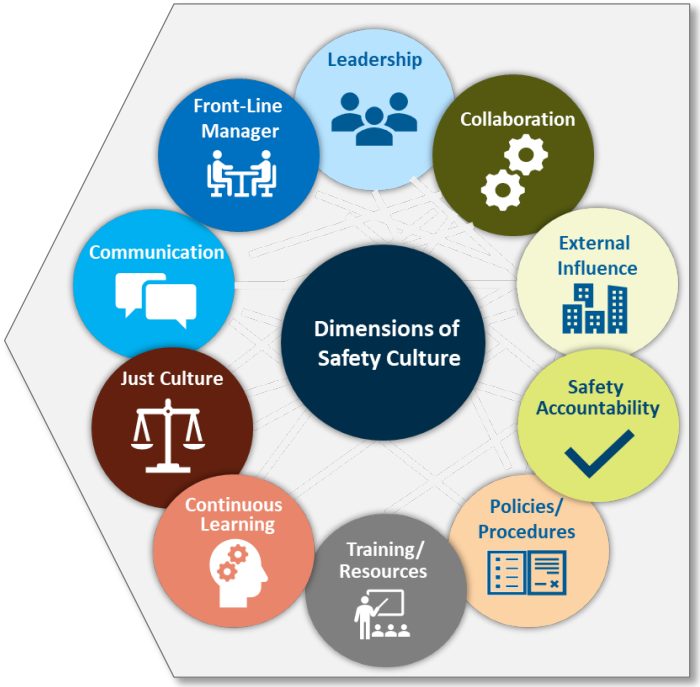
- Overall Opinions about VSRP
- "Must Haves" for VSRP
- Critical Success Factors

Safety Culture Enablers

- Passionate Workforce Committed to Safety
- Effective and Supportive Front-Line Managers
- FAA Administrator's Support for Safety
- Well-Aligned Safety Goals and Policies

Safety Culture Barriers

- Senior Leadership
- External Pressure
- Talent Management
- Just Culture
- Collaboration and Data Sharing



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Presentation of Assessment Findings

- **Header:** Theme or high-level categorization of the findings.
- **Findings:** Key observations and feedback that we captured in Stakeholder Interviews (i.e., AVS executives, labor leaders), the Safety Culture Survey, and Focus Groups that support the theme.
- **What We Heard from Interviews and Focus Groups:** Representative quotes from Stakeholder Interviews and Focus Groups that support the Findings.
- **Safety Culture Survey Results:** The major supporting findings highlighted in the AVS-wide Safety Culture survey, captured from both:
  - Quantitative survey findings
  - Key themes from the responses to the open-ended question: *If you could do one thing to strengthen the safety culture, what would it be?*

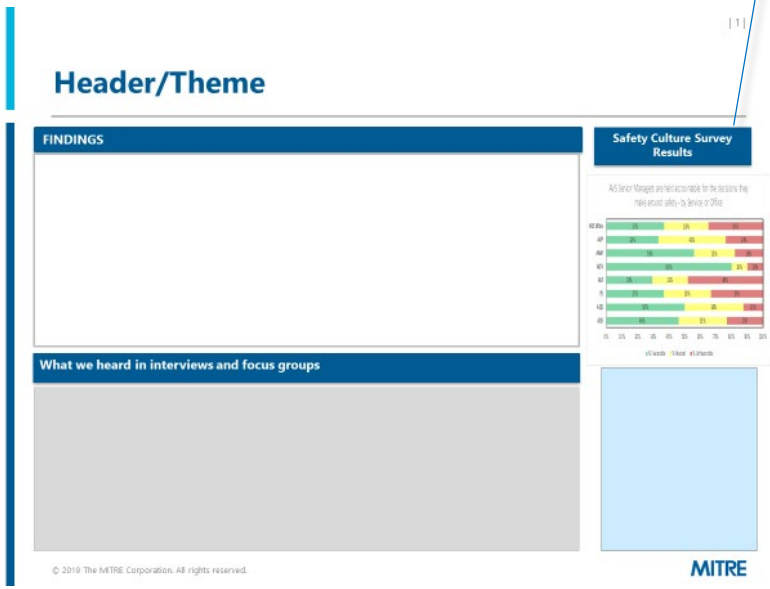
Rules of Thumb for Interpreting Survey Results

Strength:

- >= 65% of survey respondents provided a favorable response

Opportunity for Improvement

- <50% of survey respondents provided a favorable response or;
- >= 30% of survey respondents provided an unfavorable response



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4. Key Findings: Voluntary Safety Reporting Program (VSRP)

Overall Opinions about VSRP

FINDINGS

1. ***Most employees indicated that they would go to their manager first if they had a safety issue/concern, but a VSRP would be a good option if they didn't have a trusting relationship with their manager or no action was taken.***
2. ***Some noted that there are already robust safety reporting programs which could be used or improved, questioned why a new VSRP is needed, and expressed concern about duplication and the multiple ways to report.***
3. ***Managers had more concerns than buy-in to the VSRP, including:***
   - The new workload needed to investigate safety issues/incidents would put a burden on managers (experience with hotline and whistleblower cases feeding this concern).
   - Potential abuse (frivolous reporting) of the system could lead to non-productive reports and wasted time and resources.

Promising Practice at GM: Created a safety field investigation team and a new, more comprehensive support organization to process and identify safety issues and fix them fast. They established back-end processes so they can analyze product-related safety issues in a centralized way, looking at the issue from multiple sides, and consider interdependencies and impacts across the company and product lines, to ensure they fully understood the issue and addressed it systematically.

What we heard in interviews and focus groups

Finding 1

"I would use it [VSRP]. It mitigates against the situation when a manager is too 'close' to the applicant…There is no way to elevate your concern when management chooses not to take action."

"[VSRP] would be a relief valve for an employee who feels it is their only recourse."

Finding 3

"We recognize the need to 'feed the beast' but don't want to be unduly burdened and taken away from our regular jobs."

"It is understood that only 10 – 20% of [safety] complaints have 'fire behind the smoke' – how can we get through the smoke efficiently without taking people away from their jobs for a significant amount of time (which may in the end, have a greater negative impact on safety)?"

"When someone says they have a safety issue, you can't get them away from it; it's like a 'dog with a bone'. They don't like being told that it's not [a safety issue]."

"There needs to be guard rails to prevent abuse and more clarity around what is a safety concern versus an acceptable risk—could have lots of unproductive reports to go through…"

"Must Haves" for VSRP

VSRP

FINDINGS

4. Employees, managers, and stakeholders (i.e., executives, labor leaders) identified several "must haves" for the VSRP.

- Start with the attributes of other robust reporting programs when designing the VSRP (e.g., ASAP, ATSAP)
- Anonymous submission of safety issues/concerns – Although some felt it would be easy to identify who reported a safety issue due to the technical nature of their jobs
- Independent, neutral body to review/investigate safety issues (no one with "skin in the game")
- Easy to access (e.g., link to AVS home page) and use (not onerous/burdensome)
- Consistent and fair process with no retribution for reporting safety issues/concerns
- Timely and visible action in response to safety issues to build trust in the VSRP
- Clear communication back to the report initiator about the status of the reported issue and reason for action/inaction (feedback loop)
- Visibility and transparency on status of issues that is broader than the submitter
- A tracking system to record issues and identify patterns in the data

Promising Practice at GM: FedEx-type of tracking is used for submitted issues. Employee can go to website and see where their issue is in process and what disposition is. If not satisfied, they can express their concern.

What we heard in interviews and focus groups

"The things we deal with in engineering are so technical and program-specific that you can promise anonymity, but it's difficult to achieve in practicality, even if identifying information is stripped from it."

"The independent review board must include people from a different office, groups of managers from someplace else. Must be independent. It is important that it can't be local."

"[The VSRP] should be user-friendly – we're all busy – shouldn't have to write a novel."

"Need to perceive that the safety issue will be acted on – if I reported something, make sure it is not going in 'one ear and out the other'."

"Systems don't work if there is not a tight connection to the submitter... If you want people to participate, you have to provide feedback."

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Critical Success Factors for VSRP

VSRP

FINDINGS

5. There were several suggestions for rolling out, maintaining, and ensuring the success of the VSRP.

- Strong visible commitment to the VSRP from senior leadership who need to lead the way and set example
- A clear vision for the VSRP
- Dedicated staff/resources to manage the VSRP
- Strong communication/marketing plan and training to promote the VSRP and educate the workforce (e.g., intent of the program, scope of the program, types of safety issues/concerns that should be reported, how VSRP is different from other reporting systems, compelling reason to use the VSRP, how to use the VSRP)
- Sharing success stories and a focus on quick wins to show the worth of the program
- Providing incentives for those who report valid safety concerns that lead to substantive improvements in safety
- Prototyping or piloting the VSRP in one region
- Partnering with bargaining units in the development, communication, and launch of the VSRP

Promising Practice at GM: VSRP promoted heavily through internal communications; CEO sends out reminders for use; encourages people to use their judgement in what to report.

Promising Practice at GM: Incentivize and recognize employees through lunch with the CEO and VP of Safety, as well as letters from the VP of Safety.

What we heard in interviews and focus groups

"I have personally submitted safety issues in reporting systems and the issues remained in limbo and there was no true leadership commitment."

"Need commitment from the highest level of the organization, the ability to reach straight up to the Administrator. Airlines can go directly to the CEO. At FAA, managers and other leaders get in the way."

"Strategic communication will be integral to the VSRP's success."

"Given the existence of so many programs, it is critical for everyone to distinguish the intent of the new VSRP from other programs."

"It starts at top leadership – if we are not the ones who set the example none of this will matter. When employees see changes are top filtering down, direction is different, feel a part of it, have a voice – that's when it will work."

5. Key Findings: Safety Culture Enablers

Overview of Safety Culture Enablers

Safety Culture Enablers

- Safety Culture Assessment **Enablers** highlight the **strengths** of the AVS safety culture.
- Below are the four key enablers MITRE identified and the Safety Culture Survey dimensions they represent.

Safety Culture Enablers	Safety Culture Survey Dimension
1. Passionate Workforce Committed to Safety	
2. Effective and Supportive Front-Line Managers*	
3. FAA Administrator's Support for Safety	
4. Well-Aligned Safety Goals and Policies	

** Front-Line Managers are defined as individuals who provide first-level supervision to subordinate employees and manage activities of one operating unit, project, or program area. The Front-Line Manager provides employees with day-to-day direction, advice, and sign-off/approval of work products.*

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Passionate Workforce That is Committed to Safety

Safety Culture Enablers

FINDINGS

1. The FAA workforce is passionate about and committed to safety.

- Focus group participants were engaged and provided deep insights into the current safety culture, suggestions for strengthening the culture, and "must haves' for a new VSRP.
- Survey results indicated that employees are proactive in maintaining safety – they keep themselves informed about safety issues and speak up when they have a safety issue/concern.
- Stakeholders (i.e., executives, labor leaders) who were interviewed felt that AVS employees are dedicated to and passionate about safety and are ready and willing to report safety issues, and unafraid to bring up problems.

What we heard in interviews and focus groups

"In AVS's workforce you have people sincerely dedicated to safety, passionate about safety; intention is always good."

"We have a self-confident culture…We do it everyday. We are willing to report and confront."

"The dedication of people that work here is amazing. They are certain they want to be part of safety. At FAA, [employees'] minds are always on safety."

Safety Culture Survey Results

69% of AVS survey respondents **agreed** that they are comfortable reporting safety issues/concerns. This was a positive finding for all Services/Offices and levels.

67% of AVS survey respondents **agreed** that employees keep themselves informed about safety issues.

65% of AVS survey respondents **agreed** that employees speak up when they have a safety issue or concern.

Effective and Supportive Front-Line Managers

Safety Culture Enablers

FINDINGS

2. *Front-line managers are viewed as providing strong support for safety by:*

- Listening to and addressing employee safety concerns
- Valuing employee suggestions for improving safety
- Providing support to employees when making safety-related decisions
- Respecting employees' technical judgement and backing their decisions
- Leading by example -- "walking the talk" when it comes to safety

What we heard in interviews and focus groups

"No issues with front-line managers. They are all about safety and being supportive."

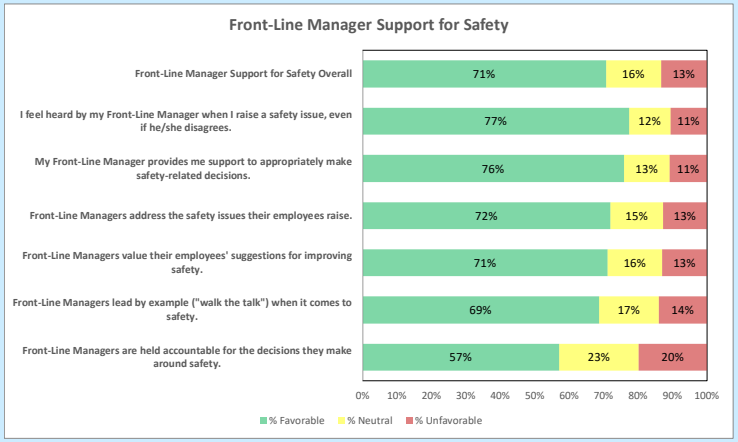
"Action is taken in most cases when handled at local management level. They fix at local level."

"…[Front-line managers] back up employees on decisions and trust employees on their decision making, unless discovering a reason not to do so."

Safety Culture Survey Results

Front-line managers across Services/Offices are viewed as showing strong support for safety.

Over 70% of AVS survey respondents provided a favorable response to most of the front-line manager survey questions.



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FAA Administrator Support for Safety and Well-Aligned Safety Goals and Policies

Safety Culture Enablers

FINDINGS

3. ***The perception is that the FAA Administrator is visibly demonstrating a commitment to safety and communicating this to the workforce.***
   - Weekly videos from the Administrator remind employees that FAA is not wavering on safety and provide information about what is going on with the 737 Max.
   - Specifically, employees cited the Administrator's broadcast message that FAA would recertify the 737 Max only when FAA has determined it is safe as sending a powerful message to FAA employees that safety is the priority.
4. ***The majority of survey respondents indicated that AVS safety goals, policies and procedures are aligned with AVS's commitment to safety, and employees understand how they apply to their work.***
   - However, focus group participants felt that some safety-related policies and procedures may need updating.

What we heard in interviews and focus groups

Finding 3

"Steve's [Steve Dickson, FAA Administrator] actions were consistent. He's committed. Communications come straight from him. He does a short video clip every Friday. It's very effective communication."

"Steve's emails to the public were good too."

Safety Culture Survey Results

73% of AVS survey respondents **agreed that they understand** how AVS's safety goals, policies, and procedures apply to their work.

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6. Key Findings: Safety Culture Barriers

Overview of Safety Culture Barriers

Safety Culture Barriers

- Safety Culture Assessment **Barriers** represent potential **opportunities for improvement** for the AVS Safety Culture.
- Below are the five key barriers MITRE identified and the Safety Culture Survey dimensions they align with.

Safety Culture Barriers	Safety Culture Survey Dimension
1. External Pressure	External Influence; Leadership
2. Senior Leadership*	Leadership; Safety Accountability; External Influence; Communication
3. Talent Management	Training/ Resources; Leadership
4. Just Culture	Just Culture; Safety Accountability
5. Collaboration and Data Sharing	Collaboration; Training/ Resources

** For purposes of these findings, AVS Senior Leadership includes the Associate Administrator for Aviation Safety, Executive Directors, and Deputy Executive Directors.*

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External Pressure (1 of 2)

GM Promising Practice: A culture, along with supporting policies, in which profit/revenue can not be discussed nor be a factor in any of their decisions when the safety of their customers is being considered (e.g., safety recalls of their products).

Safety Culture Barriers

FINDINGS

1. ***The perception is that external pressure from industry and Congress, and how senior leadership responds to this pressure, is one of the biggest barriers to safety. Focus group participants felt that:***
   - FAA employees in the field are strongly pressured by industry to meet their production deadlines; when industry perceives employees are standing in the way, they escalate to senior leadership and/or Congress. Examples of responses to pressure include: Reversal of staff engineer recommendations; slow-rolling of critical rule updates; and replacing individuals (including within ODA Units) with others who are more accommodating.
   - There is an unwritten code to be more "liberal-minded" (versus conservative) in terms of safety/risk and to find win-win solutions that benefit industry.
   - Managers are caught in the middle – while Congress, FAA senior leadership, and policy direct managers to be more "liberal minded" and accommodating of industry, technical staff in the field are responsible for identifying safety issues and concerns as their roles require.
   - FAA staff can be over-powered in meetings with industry, given the "firepower" that industry will bring to the table to get what they want.

What we heard in interviews and focus groups

"Industry often puts pressure on FAA, and this has been happening for years; [industry says] 'we will lose money if you don't certify our plane by this date'."

"Industry has FAA executives on speed dial and know their cell numbers, questioning FAA decisions constantly. All phone calls from Gulfstream are accepted from FAA executives. These actions deflate people and FAA morale suffers."

"They [industry] just keep going up the chain until they get the answers they want."

"[The message is] 'Don't rock the boat' with Boeing."

"It feels like we are showing up to a knife fight with Nerf weapons. It is a challenge to be an equal match with Boeing in the meetings/conversations."

Safety Culture Survey Results

Less than 40% of AVS survey respondents **(39%) agreed** that industry has an appropriate level of influence on AVS safety decisions.

49% of AVS survey respondents **disagreed** that FAA makes data-driven decisions about safety regardless of external pressure.

Open-ended Response Theme

FAA needs to address industry, lobbyists, and other political pressure (this topic received the most comments).

External Pressure (2 of 2)

Safety Culture Barriers

FINDINGS

2. ***There is a concern that the FAA - under Title 49 of the United States Code (49 USC) 44702(d) - has delegated too much authority to industry which negatively impacts the safety of the National Airspace.***
   - The perception among many employees is that the current delegation system and ODA Model is causing FAA to move further away from its safety mission and creating confusion about FAA's role (as a regulator vs. promoter of safety), with some employees questioning what the FAA is ultimately accountable for in terms of aviation safety.
   - The delegation system requires that FAA rely on the safety mindset and culture of the companies it oversees and certifies; when the safety culture of industry organizations is compromised or inadequate, the system/model is perceived as being much less effective.
3. ***The delegation system has changed the nature of some employees' work, leaving some feeling discontented and disempowered – there is a lack of alignment between the staffing model and the delegation system/model currently in place.***
   - Some employees reported being too focused on "pushing paper" versus engaging with applicants and examining aircraft, negatively impacting their ability to perform their jobs.
   - Some managers reported that employees have not fully embraced or grown into their new roles, while many technical staff reported tension and frustration with their new roles.
   - Some employees reported being critically understaffed to execute the oversight work of industry.

What we heard in interviews and focus groups

"There are mixed messages due to pendulum shifts regarding delegation…; should promote FAA's role as a regulator."

"FAA needs to focus more on just providing oversight; need to be 70% engaged and 30% doing oversight."

"Our good safety record pushed us to delegate to manufacturers, but if they don't have the same dedication to safety, it is eroded."

"Set the expectation that we need companies to live the values of safety…it's not just about FAA's culture."

Safety Culture Survey Results

43% of AVS survey respondents **disagreed** that FAA appropriately delegates certification activities to organizations and individual designees external to FAA.

Open-ended Response Theme

There is a need to increase the regulatory authority of inspectors in the field (this topic received the second most comments).

Senior Leadership (1 of 4)

Safety Culture Barriers

FINDINGS

1. ***There is a lack of trust and confidence in AVS Senior Leadership, which is primarily felt by those in the field (and most prominently in Seattle).***
   - Employees expressed frustration that AVS senior leaders accommodate (or "cave into") the requests of applicants/operators; they are perceived as frequently caring more about achieving win-win solutions with industry (i.e., to help industry meet their cost and schedule requirements) than about safety.
   - Employees believe AVS senior leadership painted "too rosy of a picture" in the aftermath of the 737 Max mishap and did not acknowledge the needed changes to FAA safety-related policies and processes.
   - Some felt that senior leaders' history working in industry breeds familiarity and the desire for industry to be successful, leading to too much trust in industry.
   - The perception is that no one at FAA has taken responsibility or been held accountable for the 737 Max (e.g., Boeing fired leaders while AVS has not made any leadership changes).
   - Stakeholders who were interviewed (i.e., executives, labor leaders) acknowledged that trust is a barrier to a safety culture and the success of the VSRP (need a culture of trust).

What we heard in interviews and focus groups

"Employees have confidence in co-workers but feel highest level leaders are compromised and have torn loyalties."

"They are political animals…When you raise it up the chain, it's not the safety argument being heard, it's the business argument."

"One reason people distrust upper management is because of communications from leadership that 'our processes are fine', even after 340-plus people died."

Safety Culture Survey Results

37% of survey respondents **agreed** that Senior Managers* are held accountable for the safety decisions they make.

Open-ended Response Themes

Upper level management needs to be held accountable for their actions and decisions around safety.

FAA has a tendency to put profit over safety and has too close a relationship with industry.

*The survey definition of Senior Managers included senior leaders and their direct reports.

Senior Leadership (2 of 4)

Safety Culture Barriers

FINDINGS

2. ***There is the perception that AVS senior leaders do not respect the judgement of technical staff in the field who are tasked with maintaining aviation safety, resulting in a sense of demoralization and concern about aviation safety.***

   - Technical experts in the field don't feel that their recommendations and decisions are backed by AVS senior leaders and their decisions are often overturned.
   - Some employees (primarily in Seattle) feel powerless due to the feeling that they can't raise a "red flag" if there is a safety issue.
   - Some managers, however, believe that employees are not embracing and adapting to the change AVS is undergoing, are following the regulations "too much by the book," and don't have a clear understanding of how and why safety decisions are made (and the data used to make these decisions).

What we heard in interviews and focus groups

"When senior management makes decisions that are not aligned with the SMEs (go against what those in the field are telling them), it degrades the safety culture."

"Senior executives have no faith in the field and don't back their decisions."

"There is no respect for an expert culture that has existed through years of experience. There is no acknowledgement of recommendations made by experts or an explanation about why a different decision was made."

"My expertise is not needed; why am I here?"

"There is a fallout of us not being able to do our job. Accidents happen and people get killed."

"It comes down to the interpretation of regulations and there are often difficult conversations with employees to determine what is substantiated by rules and guidance."

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Senior Leadership (3 of 4)

Safety Culture Barriers

FINDINGS

3. Although AVS senior leaders are viewed as communicating that safety is a priority, many in the field do not believe they are "walking the talk" when it comes to safety.

- Perceptions from the focus group participants were less favorable than the survey findings.
- Accommodating industry and making decisions about safety that are not aligned or go against technical staff recommendations fuels the perception that senior leaders are not committed to safety (see Findings 1 and 2).
- Conversely, those from Headquarters described senior leaders as demonstrating a strong commitment to safety by putting resources into safety programs and SMS, talking about safety during meetings and onsite visits, and spending the time needed to certify the 737 Max.

What we heard in interviews and focus groups

Comments from the Field

"I have seen leadership talk about safety, but they haven't 'walked the talk'."

"The higher the level of management, the less concerned they are about safety."

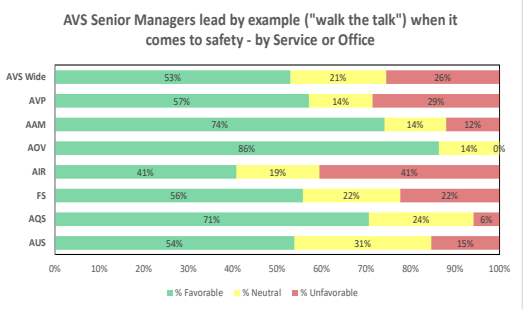
Comments from Headquarters

"Senior executives are committed to safety…'walk the talk' and take mishaps seriously. They are focused on risks and data – it is not business as usual."

"They [senior executives] are constantly placing emphasis on safety and don't stray."

Safety Culture Survey Results

AIR survey respondents had the least favorable opinions about Senior Management commitment to safety.



Open-ended Response Theme

There were negative opinions about the safety perspective and effectiveness as safety leaders of AVS upper level management.

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Senior Leadership (4 of 4)

Safety Culture Barriers

FINDINGS

4. The perception is that AVS senior leaders focus too much on communicating and managing up and not enough on communicating downward and engaging the workforce – they need to "look down, not up".

- There is a need for more transparency and communication about safety decisions made and why they were made, how safety issues are being addressed, lessons learned, and status of the 737 Max.
- Employees indicated that they get most of their information from their front-line managers and external sources.
- Decisions made between FAA Headquarters and industry are not always communicated back to field management and technical experts who need the information to do their jobs effectively.
- The perception is that decisions are made at higher levels than are needed and employees are not included in the process.

What we heard in interviews and focus groups

"Executives talk to each other rather than talk to us."

"Things flow up to Headquarters, but you don't know what goes on up there or how decisions are made."

"We need consistent messages regarding how incidents are being addressed. We have received mixed messages."

"I get more information from CNN than internally."

"Top down decision-making kills employee initiative and sense of trust."

Safety Culture Survey Results

Open-ended Response Theme

There is a need for increased communication between management and employees. Suggestions included management providing frequent, detailed information to employees, more face-to-face interaction, and ensuring employees are aware of the impact of their work.

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Talent Management (1 of 3)

Safety Culture Barriers

FINDINGS

1. ***There is a perception that staffing shortages in key specialties (ASIs, Operations Inspectors, flight test pilots, engineers) and administrative positions impact safety.***
   - The survey revealed that staffing shortages are most prominent in AIR, FS, and AOV.
   - Not having enough administrative staff takes technical staff away from their safety roles (too much time spent on administrative work) and makes their work less engaging.
   - Staffing shortages are due to the length of the hiring process, difficulty competing with industry to recruit technical talent (e.g., due to pay), and the inability to backfill positions when employees transfer, get promoted, or retire.
   - Focus group participants were encouraged that there are current initiatives underway to address staffing issues (e.g., Hiring on the Spot initiative).

What we heard in interviews and focus groups

"Safety is greatly diminished when there are not enough people to take a sufficient look at anything."

"Flight test pilots outside of the FAA are receiving double pay from industry. Our pilots travel all the time and are on the road. Pay is an issue for pilots with all the major airlines hiring."

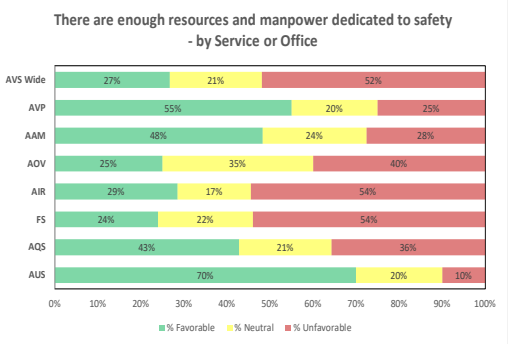
"People are leaving their current administrative positions for promotions and better pay, and AVS can't add to the workforce if this cycle is ongoing."

"Inspectors, engineers, and pilots should not be focused on administrative work as highly trained technical experts."

"If there were a huge safety issue, everything else would be pushed aside and resources would be applied to the issue."

Safety Culture Survey Results

27% of AVS survey respondents **agreed** that there are enough resources and manpower dedicated to safety.



Open-ended Response Theme

There is a need to increase staffing levels at AVS (e.g., inspectors in the field) and minimize administrative burden for technical experts in the field.

MITRE

Talent Management (2 of 3)

Safety Culture Barriers

FINDINGS

2. ***There is some frustration with the recent strategy to hire individuals without industry/manufacturing/practical experience who are not ready to step into their safety roles, which does not address immediate staffing needs.***
   - Conversely, stakeholders who were interviewed felt there is a need to hire less experienced employees with different skillsets to more effectively operate in the new safety environment (e.g., they are seeing certifications in new areas).
3. ***Focus group participants indicated that some managers don't have the technical expertise needed to understand the true risk of their decisions yet sometimes overrule the recommendations made by technical experts in the field.***
   - The belief is that managers are selected into manager positions based on managerial skills (and their ability to be compliant with senior leadership's direction).
4. ***There are concerns about the overuse of acting managers.***
   - Some focus group participants felt that the safety culture is being damaged by extensive use of acting managers, who feel they must be more compliant and are not empowered to make difficult decisions.

What we heard in interviews and focus groups

Finding 2

"FAA is hiring newly minted college degreed engineers without any practical experience, requiring more time and money to groom them; engineers used to come from industry bringing a plethora of experience."

Finding 3

"It is common for people to be selected based on managerial skills only regardless of their technical expertise…they don't understand the true risks of the decisions they are making; they are making decisions that they don't have a clue about."

"There is the perception that technical skills don't matter for managers and they are selected based on their ability to be molded and compliant with upper management's direction."

Finding 4

"I have had seven division chiefs over the last seven months."

Talent Management (3 of 3)

Safety Culture Barriers

FINDINGS

5. There are opportunities to improve safety-related training, although some pockets of AVS feel they receive enough training.

- Some focus group participants felt that safety-related training has decreased (with an increased reliance on on-the-job training), citing a lack of training in areas such as policies and standards, and training for inspectors and audit leads.
- The perception is that training is outdated because it does not include important safety-related policy or system changes or updates to technology.
- There is frustration with the current planning process and tools (e.g., CMRIS) for training; future training plans must be in place before the current year is approved.
- Participants noted that the following improvements in training would enhance the safety culture:
  - Ongoing curriculum development to ensure anticipated safety changes are incorporated in training
  - Training on new technology to allow employees to maintain pace with industry and current job requirements
  - Training on how to use reporting systems to identify and mitigate risks

What we heard in interviews and focus groups

"By the time you get the guidance, there is a gap of 10 years".

"It is always a struggle between standardization and flexibility. Defined modules and directed training were good to develop at first, but the minute a new concept or procedure is established there is an instant gap in the curriculum."

"We need to train on what it takes and what it means to be a good regulator. Technical expertise is only half of it."

"We are tasked with tremendous responsibility but can't get realistic and current training…"

Safety Culture Survey Results

Less than one-half of AVS survey respondents (45%) **agreed** that employees and managers receive adequate training on safety policies, procedures, and systems.

Open-ended Response Finding

There is a need to maintain inspectors' technical expertise and provide them with better training for conducting surveillance in the field.

Just Culture (1 of 3)

Safety Culture Barriers

FINDINGS

1. ***While there is comfort in reporting safety issues/concerns to front-line managers, there is reluctance to report these issues to those higher up in the organization. Additionally, while formal retribution is infrequent, employee see clear and subtle negative consequences for raising safety issues, which is most pronounced in Seattle and Dallas.***

   - Focus group participants indicated that subtle retribution can be seen in the form of being treated differently, being labeled as a complainer, given a different assignment, not given a promotion, or moved off a team.
   - Stakeholders who were interviewed (i.e., executives, labor leaders) stressed the importance of creating an environment where employees can express their views about safety issues without fear of retribution.

What we heard in interviews and focus groups

"Fear of retribution is felt from senior executives. People feel like they are smacked down."

"Some employees who were invited to participate in focus groups did not come due to a fear of speaking out."

"We have no problem with our supervisor or local management. It is the higher ups that are our concern."

Safety Culture Survey Results

34% of AVS survey respondents indicated that fear of retribution is one factor that may prevent employees from reporting safety issues.

MITRE

Just Culture (2 of 3)

Safety Culture Barriers

FINDINGS

2. There is a perception that action is not taken and feedback is not provided when safety issues/concerns are reported, which leads to distrust. Focus group participants cited several reasons for this perception:

- Reported safety issues are sometimes raised to senior leaders where it goes into a "black hole".
- Feedback is not provided to the reporter about how their issue is being addressed or why it is not being addressed.
- It can take a long time to resolve a safety issue (sometimes a year or longer).
- Employees don't always understand what is considered a safety risk (sometimes reported issues are acceptable risks).

What we heard in interviews and focus groups

"Some issue reported to front-line managers can be solved and valid. However, some issues must be raised to the senior executive level, and sometimes it goes into a 'black hole'."

"AVS prioritizes the most important [safety] issues because it doesn't have the resources to address everything. Senior leadership needs to communicate that they are aware of the issues but are focusing on other critical issues given limited resources."

"We have a culture where people are willing to report things. But are they heard? Is someone running with it? Is it acknowledged, fixed?"

Safety Culture Survey Results

Less than one-half of AVS survey respondents (**49%**) **agreed** that appropriate action is taken in response to reported safety concerns/incidents.

- This was an issue predominantly for AIR.

35% of AVS survey respondents **agreed** that employees receive timely feedback on how their safety concerns are being addressed.

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Just Culture (3 of 3)

Safety Culture Barriers

FINDINGS

3. Accountability for safety actions and decisions needs to be better defined, promoted, and consistently applied throughout AVS.

- Focus group participants felt it is difficult to hold people accountable because there is a lack of ownership of safety decisions (too many approvals needed, can easily push something off to another organization) and the compliance philosophy adds complexity and creates gray areas.
- The reorganization has led to a lack of clarity around roles and lines of accountability.
- There is inconsistency in how standards of accountability are applied across levels. The perception is that if an employee were to do something wrong or make a bad decision, they would receive harsher discipline than those higher up in the organization.
- How employees define/view accountability for safety (e.g., being fired or demoted) is not consistent with a Just Culture (correcting, coaching and training people who make safety mistakes/bad decisions).

What we heard in interviews and focus groups

"There is a lack of ownership due to so many people needing to sign off on something. People 'pass the buck' and assume the next person up will find the issue."

"There are less clear lines of accountability with the reorganization and it causes confusion over peoples' roles."

"Accountability should not be used to create a culture of fear; the focus should be on how the situation or system could be improved versus placing blame."

"There needs to be a Just Culture where managers correct, counsel, and assign remedial training. Employees who have not met safety/compliance standards in the past have been treated harshly."

Safety Culture Survey Results

38% of AVS survey respondents **agreed** that employees who intentionally take unacceptable risks regarding safety are held accountable.

28% of AVS survey respondents **agreed** that standards of accountability are consistently applied.

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Collaboration and Data Sharing (1 of 2)

Safety Culture Barriers

FINDINGS

1. ***Focus group participants felt that individuals within AVS have a collaboration mindset and proactively reach out to others at AVS and get the support they need.***
2. ***However, at the organization level, the reorganization has introduced new functional stovepipes and has had a negative impact on collaboration and communication across the organization.***
   - The reorganization has resulted in a lack of clarity in roles and responsibilities, impeding cross-division communications, information sharing, and collaboration as employees and managers are not clear on whom to call or where to go for information/support.
3. ***Focus group participants in Seattle felt that there is a need to improve collaboration between AIR and FS to enhance aviation safety.***

What we heard in interviews and focus groups

Finding 1

"I would give us 'A' for effort [for internal collaboration], although execution is not always great."

Finding 2

"The AVS reorganization continues to impact collaboration. If AVS employees knew who to talk to internally, it would work well."

"The AVS reorganization has stove-piped communication flow; forces people to try and 'reinvent the wheel' and generate individual solutions for the same problem because no one know what the other person is working on."

Finding 3

"If you look at the lifecycle of aircraft – from the design process, then build, then use and service – the risks stack up and you're out of tolerance pretty quick. When people aren't communicating across areas, if one person makes a decision that others might need to know, then risk is increased (e.g., if someone approves something on the edge [in design], then we need to know that in operations). Eventually you have an accident."

Safety Culture Survey Results

Less than one-half of AVS survey respondents (**48%) agreed** that there is effective collaboration in FAA to support a safety culture.

Open-ended Response Theme

There is a need to increase awareness of division objectives, and share information on common safety practices, capabilities, and best practices.

Collaboration and Data Sharing (2 of 2)

Safety Culture Barriers

FINDINGS

4. Systems and processes are needed to support the sharing of safety-related data across AVS.

- The perception is that FAA does not have appropriate IT systems to share data in managing ODA's with manufacturers. FAA needs a centralized system.
- There is disparity between FAA and industry technology and tools and a need for updated, user-friendly, IT applications/systems for sharing data.

What we heard in interviews and focus groups

"Private sector is far ahead in technology and innovation."

"Inconsistent database systems exist and do not talk to each other."

"Industry is moving faster and faster on data, and FAA is not. We've made improvements, but FAA is not where we need to be. Need to be more agile, especially with software."

"When I worked at [Company], we had a dashboard to address hot spots every day. In FAA, our data are compartmentalized – we don't have a global look."

Safety Culture Survey Results

Open-ended Response Theme

There is a need for a system-wide data sharing program to enable access to shared data and support the reporting and management of safety issues.

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7. Preliminary Recommendations

Recommendations Overview

- AVS has a good foundation for a strong safety culture – passionate employees who are committed to safety and front-line managers who support safety.
- MITRE developed potential recommended actions for AVS to consider to address the safety culture barriers that were identified by the Safety Culture Assessment.
- Recommendations are categorized into the following areas:
  - Leadership
  - Role Clarity and Accountability
  - Communication and Collaboration
  - Talent Management
  - VSRP
- The recommendations are preliminary and intended to guide discussions with AVS senior leadership and the VSRP Matrix Team to determine:
  - Applicability to AVS, given the current environment
  - Feasibility of implementation
  - Alignment with current and planned AVS initiatives

Leadership

Focus Area	Recommended Action
Leadership	▪ Develop and implement an AVS Leadership Framework which outlines key leadership behaviors and principles that support a Safety and Just Culture. - Incorporate areas such as communicating and engaging with employees, increasing transparency, promoting the tenets of a Just Culture, and demonstrating respect for the technical expertise of employees. - Expand or enhance the leadership development program to align with the Leadership Framework. - Update existing leadership performance standards to ensure they align with agreed upon elements of the Leadership Framework. ▪ Develop guidelines for issue resolution with industry counterparts consistent with FAA's established role. ▪ Leverage change management practices to address perceived challenges around the ODA Model, promote buy-in from all levels, and equip employees to be successful in the new way of operating. ▪ Increase visibility and accessibility of the Associate Administrator for Aviation Safety and AVS Executive Directors by proactively engaging with the field to better understand their work, accomplishments, safety concerns, and directly share the direction and commitment of the organization to safety. Consider establishing a formal schedule for senior leaders to visit employees in the field to build trust and address their safety concerns. ▪ Be deliberate in communicating to field employees the clear rationale for safety-related decisions particularly when external pressures (e.g., Congress, Department of Transportation) are influencing the decision and/or when their technical recommendations are seemingly not endorsed. ▪ Send strong messages to employees that retribution for expressing safety issues and concerns will not be tolerated.

Role Clarity and Accountability & Communication and Collaboration

Focus Area	Recommended Action
Role Clarity and Accountability	▪ Clearly define FAA's role as a regulator and the implications it has on the roles, responsibilities, and accountabilities of employees in the field. ▪ Encourage front-line managers to have regular discussions with employees to clarify their roles and expectations, connect their work to the safety mission, and support them with their challenges around safety. ▪ Reevaluate current and planned reorganizations in light of the concerns raised by employees regarding the negative impact on collaboration, accountability, and role clarity. ▪ Define and communicate how AVS defines accountability, focusing on correcting, coaching, and training, and hold people accountable for safety-related actions and decisions using this definition.
Communication and Collaboration	▪ Be deliberate in communicating consistent, accurate safety-related information and messages to the workforce that reflect AVS's safety priorities. - Share information about safety decisions and their rationale, how recent safety issues are being addressed and/or why they are not being addressed, safety trends, and lessons learned. - Leverage multiple communication channels, such as town hall meetings, site visits, newsletter, and discussions at staff meetings. - Work closely with AVS Communications to craft, approve, and disseminate communications to the workforce to ensure consistency. ▪ Improve cross-AVS communication and collaboration by establishing integrating mechanisms within AVS for sharing information and learnings and solving problems. - Consider establishing formal roles charged with coordinating work across organizational boundaries (e.g., coordinator role, liaison role), and having ultimate accountability for collaboration across AVS. - Establish shared goals/outcomes for organizations that must work together to ensure aviation safety (or improve line of site to existing shared goals/outcomes if they already exist).

Talent Management & VSRP

Focus Area	Recommended Action
Talent Management	▪ Reevaluate and enhance AVS's workforce planning strategy to ensure the workforce has the right skill mix to achieve the AVS safety mission now and in the future (and successfully implement the ODA Model)*. Start by focusing on critical positions where there are staffing shortages, such as ASIs, engineers, and flight test pilots. ▪ Address shortage of administrative staff to allow technical experts to focus on their safety-related duties. ▪ Continue initiatives aimed at addressing staffing needs (e.g., Hiring on the Spot initiative). ▪ Review and continuously refresh existing safety-related training to identify gaps and ensure relevance and build new training programs or learning strategies as needed.
VSRP	▪ Ensure the VSRP includes a mechanism to provide timely feedback to those who report on the status and resolution of their issue. ▪ Create a process for maintaining confidentiality of individuals who report safety issues, while allowing for follow up and feedback to reporters. ▪ Develop and implement a communication and marketing plan to promote and educate the workforce about the VSRP, including managers who have concerns about the value and workload of a new VSRP. ▪ Provide all employees and managers with training on the new VSRP process (e.g., when and how to use the VSRP, what constitutes a safety risk, how safety issues will be investigated and resolved). ▪ Evaluate the effectiveness of the VSRP after it is rolled out and make modifications to the process as needed. - Metrics may include positive feedback from users of the VSRP, improvements in safety culture survey results, number of safety issues reported (and those that are valid), number of safety issues that result in improvements to safety/prevention of safety incidents, and more. *Note: See slides 23 and 24 for additional considerations and recommendations for the AVS VSRP.*

*Recommendation aligns with the recommendations in the *Official Report of the Special Committee in Review of the FAA's Air Certification Process, January 16, 2020.*

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8. Next Steps

Next Steps for Leveraging and Responding to the Safety Culture Assessment Findings

- Leverage the Safety Culture Assessment process to build transparency and trust.
  - Communicate the key findings from the Safety Culture Assessment down to the lowest levels of the organization to show that you have heard employees and plan to take action in response to the assessment results (e.g., in town hall meetings led by the Associate Administrator for Aviation Safety, on site presentations at field locations).
  - Continually share progress in strengthening the safety culture and responding to employee concerns about safety ("connect the dots" for employees – link actions taken to employee feedback).
- Conduct facilitated sessions with the senior leadership team to review Safety Culture Assessment findings, discuss implications of the findings for AVS and the workforce, and prioritize and agree on long-term initiatives and short-term actions for strengthening the safety culture.
- Leverage the assessment findings and recommendations to support the successful implementation of the *Aviation Safety Strategic Plan*.
- Repeat the safety culture survey in 12 – 18 months to track progress in strengthening the safety culture.

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Federal Aviation Administration (FAA) Aviation Safety Organization (AVS)

Safety Culture Survey Findings

February 28, 2020

MITRE

Table of Contents

1. Background

Objectives of Safety Culture Assessment

Key Outcomes for Long-Term Impact

AVS will sustain and strengthen the safety culture throughout the organization by:

- Promoting new and existing behaviors and practices that further develop a "Just Culture"
- Pursuing actions to identify and address safety issues and concerns
- Intervening earlier and proactively to mitigate safety risks

Objectives

Conduct Current State Assessment of AVS's Safety Culture and Identify Leading Practices

- Identify organizational enablers and barriers to an AVS safety culture and Voluntary Safety Reporting Program (VSRP)
- Create an AVS-wide baseline for tracking progress over time in strengthening AVS's safety culture
- Document leading practices in safety culture and internal and external safety reporting programs

Provide Recommendations to Sustain and Strengthen the AVS Safety Culture

- Considerations for shaping and implementing the VSRP to maximize the value
- Organizational levers for sustaining and strengthening the safety culture (e.g., culture, resource allocation, processes, leadership practices/training, communication, talent management, risk management/mitigation practices)

AVS Safety Culture Assessment: Data Collection

Interviews

Interviews with AVS executives and labor leaders to:
-Provide input for assessing the current state of AVS's culture
-Provide vision and "must haves" for the new VSRP
-Review and provide feedback on AVS Safety Culture Survey

Safety Culture Survey

Online survey for all AVS employees to:
-Identify culture enablers and barriers to a successful VSRP
-Create a baseline for tracking progress in strengthening AVS's safety culture

Focus Groups

Focus groups with employees in multiple AVS locations to:
-Dig deeper into survey results (identify "root causes")
-Identify internal best practices in safety culture
-Solicit employee suggestions for improving the safety culture
-Provide considerations for designing and rolling out the new VSRP

Document Review and Research

Review AVS documents and safety culture and reporting research to:
-Identify topics for safety culture survey
-Identify leading practices for safety culture and safety reporting programs

2. Survey Approach and Response Rates

Survey Approach

MITRE used a rigorous, proven methodology to develop the AVS Safety Culture Survey, measuring 10 critical dimensions of a safety culture.

Literature Review

- Evaluated over 20 key safety culture studies and industry papers, including leading practices in aviation safety, to identify the critical elements of a strong safety culture
- Reviewed safety culture surveys to identify relevant and proven questions

Stakeholder Input

- Interviews with AVS executives
- Interviews with labor leaders
- Feedback from AVS VSRP Matrix Team

MITRE Team Experience

- Survey research
- Qualitative research
- Culture assessment
- Safety

AVS Safety Culture Survey

10 Safety Culture Dimensions

- ❑ Leadership Commitment to Safety
- ❑ Front-Line Manager Support for Safety
- ❑ Open Communication
- ❑ Reporting and Just Culture
- ❑ Continuous Learning
- ❑ Training and Resources
- ❑ Safety Policies and Procedures
- ❑ Safety Accountability
- ❑ External Influence
- ❑ Collaboration

Survey Response Rates: Overall and by Service/Office

- The Safety Culture Survey was administered online to all AVS employees and managers (a total of 7,147) from **November 20 to December 9.**
- The overall response rate was **25%.** [Based on the number of completed surveys, the 95% confidence interval for AVS-wide survey results is approximately +/- 2 percentage points.]
- Survey results can serve as a baseline for overall AVS-wide results. However, results for some individual Services/Offices should be interpreted with caution (e.g., due to small sample sizes).

Service/Office	Number Invited	Number of Responses	Response Rate
AVS Overall	**7,147**	**1814**	**25%**
Office of the Associate Administrator for Aviation Safety	9	70	NA*
Office of Accident Investigation & Prevention (AVP)	77	22	29%
Office of Aerospace Medicine (AAM)	465	62	13%
Air Traffic Safety Oversight Service (AOV)	125	22	18%
Aircraft Certification Service (AIR)	1311	373	28%
Flight Standards Service (FS)	4957	1029	21%
Office of Quality, Integration, and Executive Services (AQS)	69	18	26%
Office of Rulemaking (ARM)	34	3	9%
UAS Integration Office (AUS)	100	15	15%
Missing (Respondents that did not identify their Service/Office in the survey	NA	200	NA

*Note: 61 respondents mistakenly identified the Office of the Associate Administrator for Aviation Safety as their place of work, distorting the response rate.

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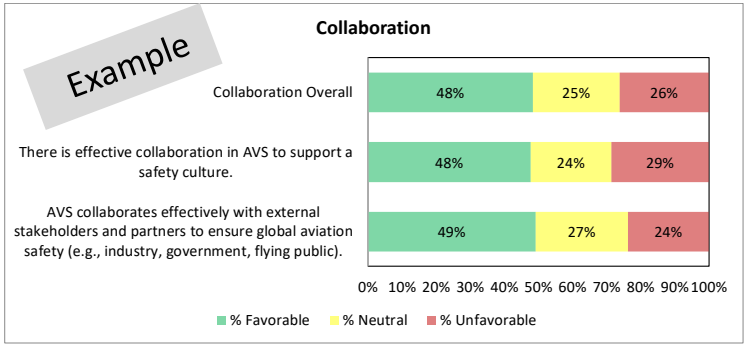
Survey Analysis

- For each survey dimension and question, frequency distributions were calculated -- showing the percent of favorable, neutral, and unfavorable responses for AVS as a whole, and each Service/Office, level, and tenure group.
  - **Favorable response:** The percent of respondents who **"strongly agreed"** or **"agreed"** with the statement
  - **Neutral response:** The percent of respondents who **"neither agreed nor disagreed"** with the statement
  - **Unfavorable response**: The percent of respondents who **"strongly disagreed"** or **"disagreed"** with the statement



Rules of Thumb for Interpreting Survey Results

Strength:

- >= 65% of survey respondents provided a favorable response

Opportunity for Improvement

- <50% of survey respondents provided a favorable response or;
- >= 30% of survey respondents provided an unfavorable response

- The survey also included one open-ended question: *If you could do one thing to strengthen the safety culture, what would it be?*
  - There were 966 comments in response to the open-ended question.
  - Key themes were identified through a text-mining topic-modeling process and subject matter expert review.

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3. Key Survey Takeaways

Key Survey Takeaways: AVS Strengths

The survey revealed the following strengths in AVS's safety culture.

1. Front-Line Managers demonstrate strong support for safety and listen to and address employee safety issues.
2. Senior and Middle Managers regularly communicate that AVS is a safety-first organization.
3. Employees are proactive in maintaining safety – they keep themselves informed about safety issues and speak up when they have a safety issue/concern.
4. There is awareness about existing safety reporting programs and when to use them.
5. Safety policies and procedures accurately reflect AVS's commitment to safety and employees understand how they apply to their work.
6. There is comfort in reporting safety concerns/issues and encouragement to do so.
   - All levels in the organization felt comfortable reporting, although managers provided more favorable responses than non-managers.

Key Survey Takeaways: AVS Opportunities for Improvement

However, the survey revealed there are opportunities for strengthening AVS's safety culture.

1. There are not enough resources, manpower, and training dedicated to safety.
2. There is a lack of accountability for safety-related decisions and actions, and accountability standards are not consistently applied.
3. There is a perceived lack of action and feedback in response to reported safety issues/concerns.
4. Although Senior Managers communicate that safety is a priority, there are opportunities for them to demonstrate an even stronger commitment to safety through their actions (e.g., "walk the talk", prioritize safety when making decisions).
5. External pressures (e.g., industry) are perceived to get in the way of safety decisions.
6. Collaboration and sharing of information within AVS and with external stakeholders to promote safety could be improved.
7. Fear of retribution was a frequently cited factor that may prevent employees from reporting safety issues/concerns.

Key Survey Takeaways: Service/Office Results (1 of 2)

The following table highlights the Services/Offices that share the AVS-wide strengths.

- The AVS-wide strengths are strengths for most Services/Offices.
- Front-Line Manager support for safety and awareness of existing safety programs are strengths for all Services/Offices.

AVS-wide Strength An X indicates the AVS-wide strength is a strength for the Service/Office.	AVP	AAM	AOV	AIR	FS	AQS	AUS
1. Front-Line Managers demonstrate strong support for safety.	X	X	X	X	X	X	X
2. Senior/Middle Managers regularly communicate that AVS is a safety-first organization.	X	X	X		X	X	X
3a. Employees keep themselves informed about safety issues. 3b. Employees speak up when they have a safety concern or issue.	X	X X	X X	X X	X		X X
4. There is awareness about existing safety reporting programs and when to use them.	X	X	X	X	X	X	X
5. Safety policies and procedures accurately reflect AVS's commitment to safety and employees understand how they apply to their work.	X	X	X		X	X	X
6. There is comfort in reporting safety issues/concerns.	X	X	X		X	X	X

Note: Due to their small sample size, there is less confidence in the results for the following Services/Offices: AVP, AOV, AQS, AUS. Results for these Services/Offices should be interpreted with that in mind, which is also the case for the results on slide 14.

Note: Results are not provided for ARM because less than 10 individuals from ARM responded to the survey. Results are not provided for the Office of the Associate Administrator for Aviation Safety because there are less than 10 individuals who work in this office.

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Key Survey Takeaways: Service/Office Results (2 of 2)

- The following table highlights the Services/Offices that share the AVS-wide opportunities for improvement.
  - External pressure is an opportunity for improvement for all Services/Offices.
  - Opportunities for Senior Managers to demonstrate an even stronger commitment to safety and lack of action in response to reported safety issues are challenges for only a few Services/Offices.
  - Survey respondents from AIR had the least favorable opinions of AVS's safety culture.

AVS-wide Opportunity for Improvement An X indicates the AVS-wide opportunity for improvement is an opportunity for improvement for the Service/Office.	AVP	AAM	AOV	AIR	FS	AQS	AUS
1a. Not enough resources and manpower dedicated to safety.		X	X	X	X	X	
1b. Not enough training dedicated to safety.	X		X	X	X		X
2a. Lack of accountability for intentionally taking unacceptable safety risks.		X		X	X		
2b. Standards of accountability are not consistently applied.	X	X	X	X	X	X	X
2c. Senior and Middle Managers not held accountable for safety-related decisions.	X			X	X		X
3a. Perceived lack of action in response to reported safety issues/concerns.				X			X
3b. Lack of feedback in response to reported safety issues/concerns.	X		X	X	X		X
4. Opportunities for Senior Managers to demonstrate an even stronger commitment to safety through their actions.				X			
5. External pressures (e.g., industry) perceived to get in the way of safety decisions.	X	X	X	X	X	X	X
6. Collaboration and sharing of information within AVS to promote safety could be improved.	X		X	X			
7. Fear of retribution was a frequently cited factor that prevents employees from reporting safety issues/concerns.	X		X	X	X	X	

Key Takeaways from the Survey: Results by Level (1 of 1)

- Senior Managers tended to have the most favorable opinions about the AVS safety culture.
- While non-managers (employees) generally had less favorable opinions about AVS's safety culture than managers (which is a typical finding), they responded favorably in 5 of the 6 areas that were identified as AVS-wide strengths, including:
  - Front-Line Managers demonstrating strong support for safety
  - Senior and Middle Managers regularly communicating that AVS is a safety-first organization
  - Awareness about existing safety reporting programs and when to use them
  - Employees being proactive in maintaining safety (e.g., keeping themselves informed about safety issues, speaking up when there is a safety concern)
  - Comfort in reporting safety issues/concerns

Key Takeaways from the Survey: Results by Level (2 of 2)

The following table highlights levels in the organization that share the AVS-wide opportunities for improvement.

- Non-managers and Front-Line Managers perceive the most opportunities for improving AVS's safety culture.
- Resources and manpower dedicated to safety and safety accountability are opportunities for improvement across levels.

AVS-wide Opportunity for Improvement An X indicates the AVS-wide opportunity for improvement is an opportunity for improvement for the level group.	Non-Manager (Employee)	Front-Line Manager	Middle Manager	Senior Manager
1a. Not enough resources and manpower dedicated to safety.	X	X	X	X
1b. Not enough training dedicated to safety.	X	X		
2a. Lack of accountability for intentionally taking unacceptable safety risks, and standards of accountability not consistently applied.	X	X	X	X
2b. Senior and Middle Managers held accountable for safety-related decisions.	X	X		
3. Perceived lack of action and feedback in response to reported safety issues/concerns.	X	X	X	
4. Opportunities for Senior Managers to demonstrate an even stronger commitment to safety through their actions.	X			
5. External pressures (e.g., industry) perceived to get in the way of safety decisions.	X	X	X	
6. Collaboration within AVS to promote safety could be improved.	X	X	X	
7. Fear of retribution was a frequently cited factor that prevents employees from reporting safety issues/concerns.	X			

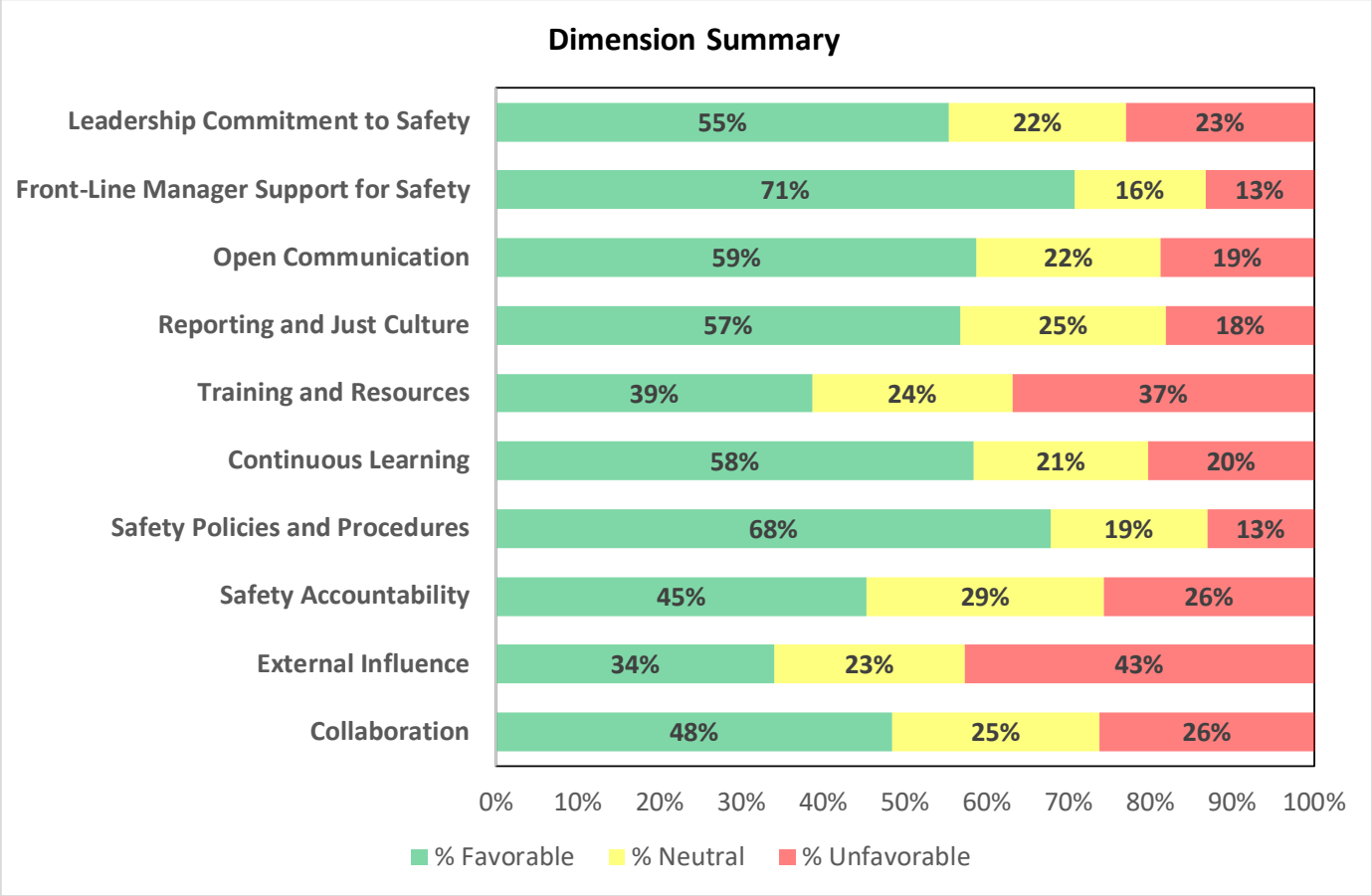
Note: Due to the small sample size, there is less confidence in the results for Senior Managers, and results for Senior Managers should be interpreted with that in mind.

4. AVS-Wide Results for Survey Dimensions and Questions

AVS-wide Dimension Results

Highest rated survey dimensions were Front-Line Manager Support For Safety and Safety Policies.

Lowest rated survey dimensions were External Influence and Training and Resources.



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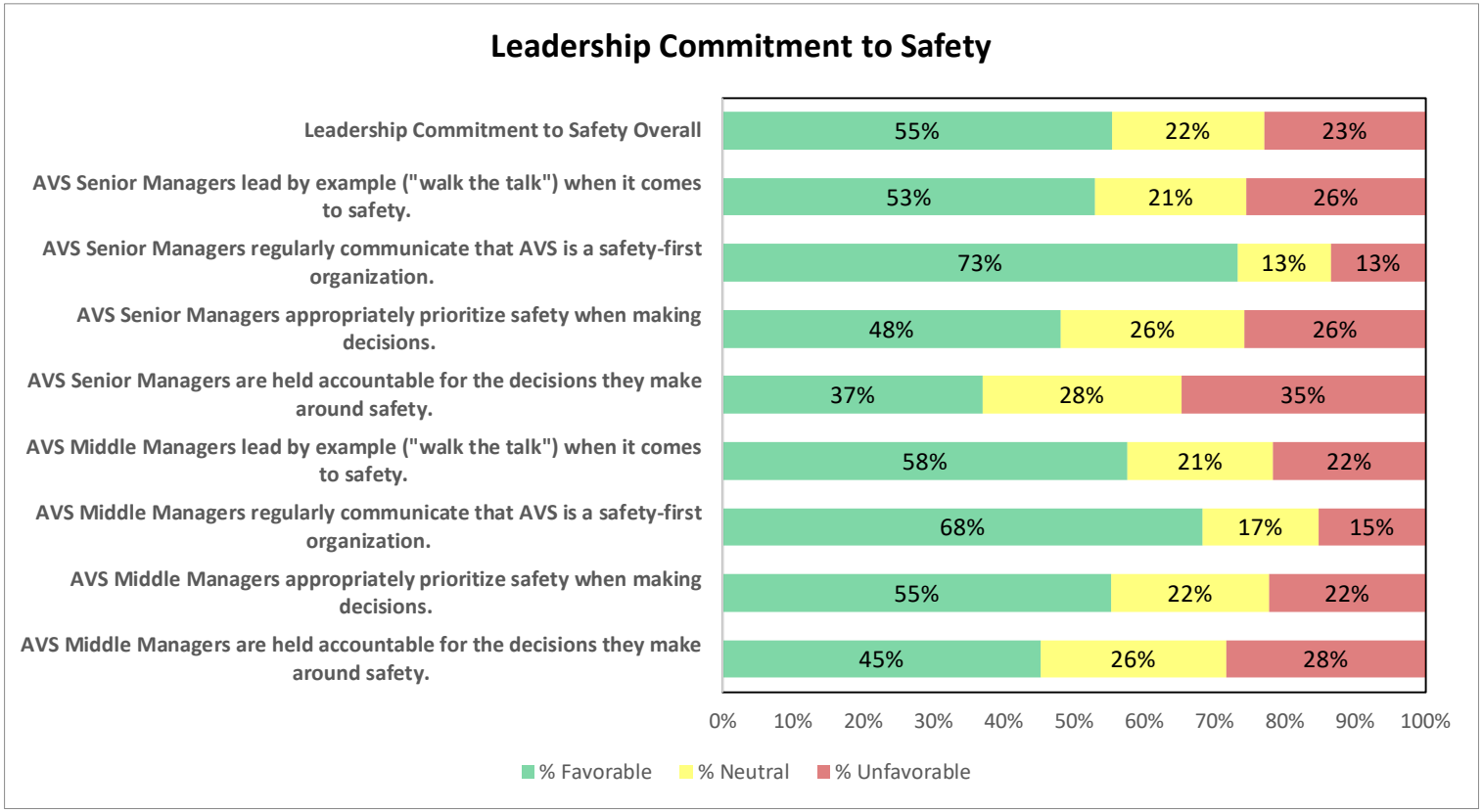
Item Results: Leadership Commitment to Safety

Leadership regularly communicates that AVS is a safety-first organization.

However, leadership is not held accountable for safety decisions.

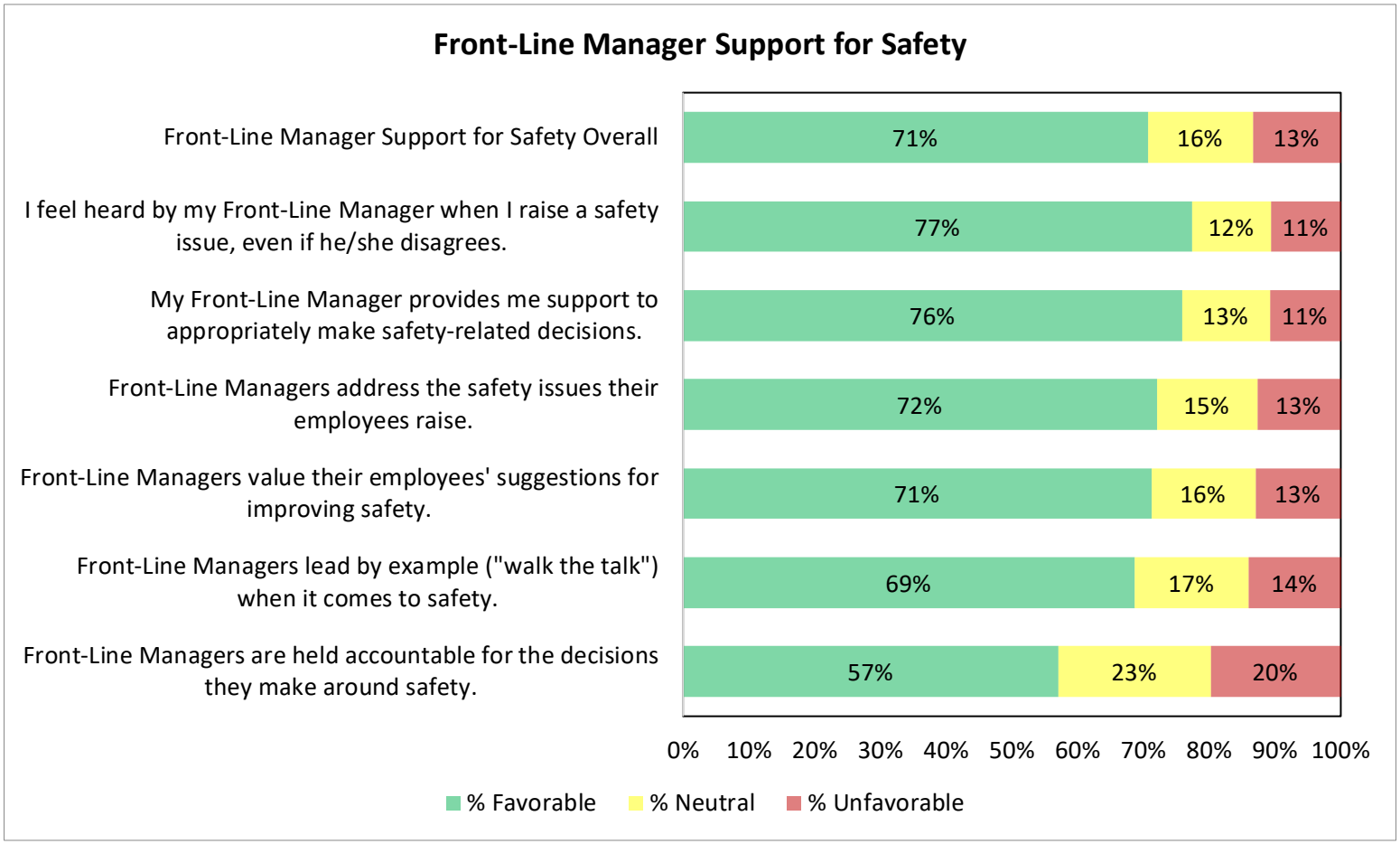
Senior Managers were rated less favorably than Middle Managers on demonstrating commitment to safety.



Item Results: Front-Line Manager Support for Safety

Front-Line Managers provide strong support for safety.

Less favorable ratings of Front-Line Managers being held accountable for safety-related decisions.



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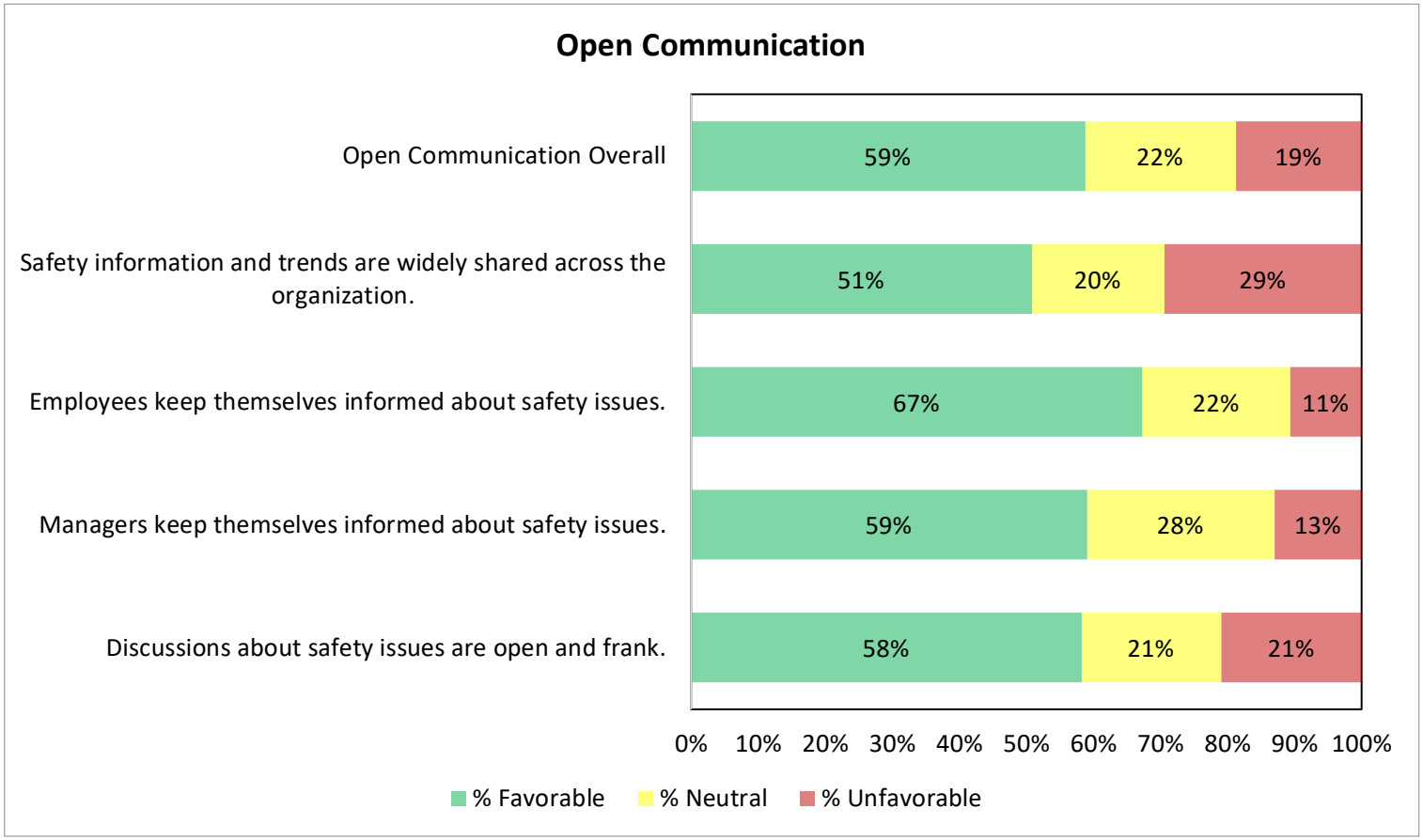
Item Results: Open Communication

Employees keep themselves informed about safety issues.

However, safety information and trends are not widely shared across the organization.



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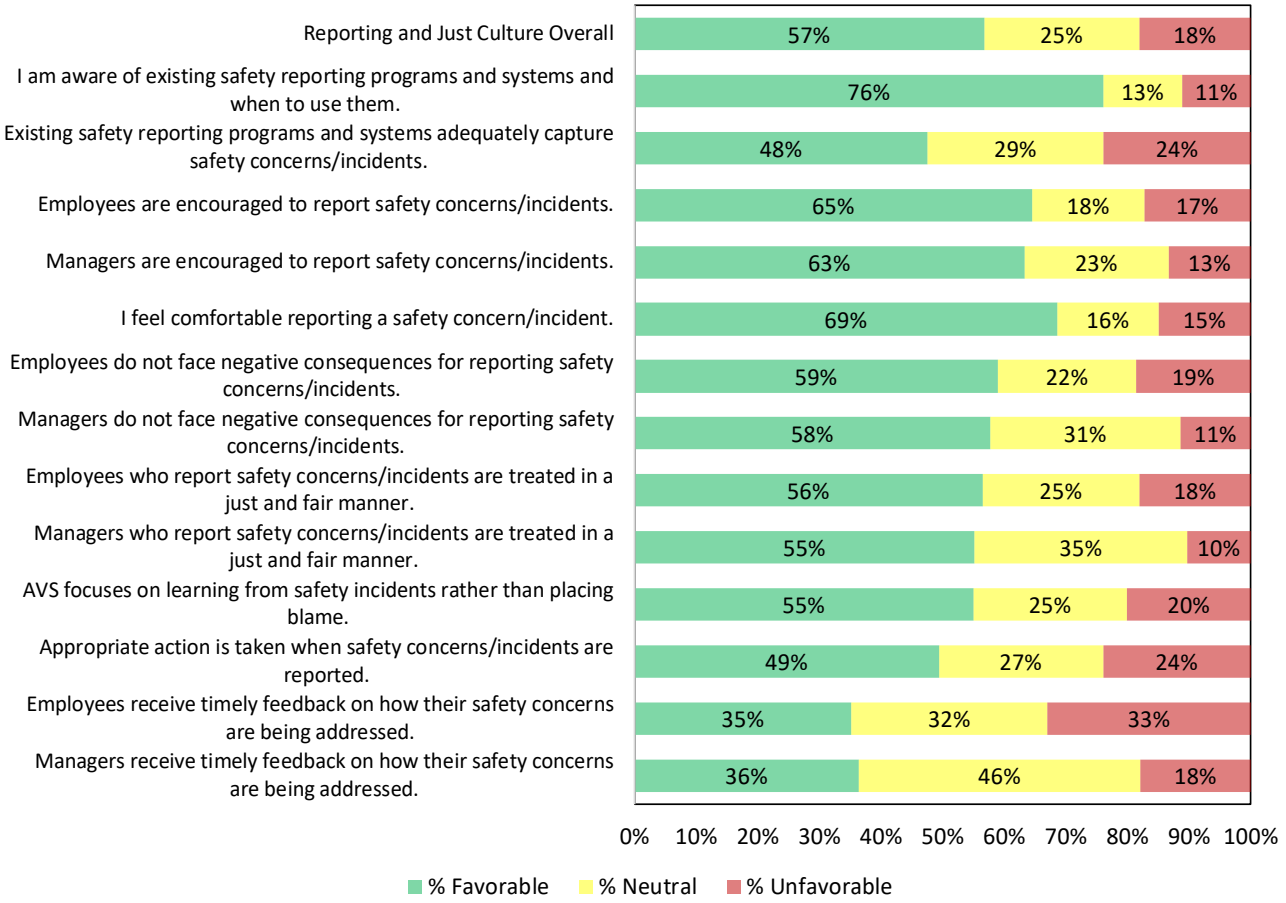
Item Results: Reporting and Just Culture (1 of 2)

There is awareness of safety reporting programs, but they may not adequately capture safety concerns/incidents.

Employees and managers are comfortable reporting safety concerns and encouraged to do so.

Appropriate action is not always taken when safety concerns are reported.

There is a lack of timely feedback on how safety concerns are being addressed.



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Item Results: Reporting and Just Culture (2 of 2)

Belief that safety concerns/incidents will not be addressed was the most frequently cited reason that safety concerns/incidents are not reported.

Lack of awareness that there is a reporting process, fear of retribution, and concern that the process is not confidential were also frequently cited as preventing reporting.

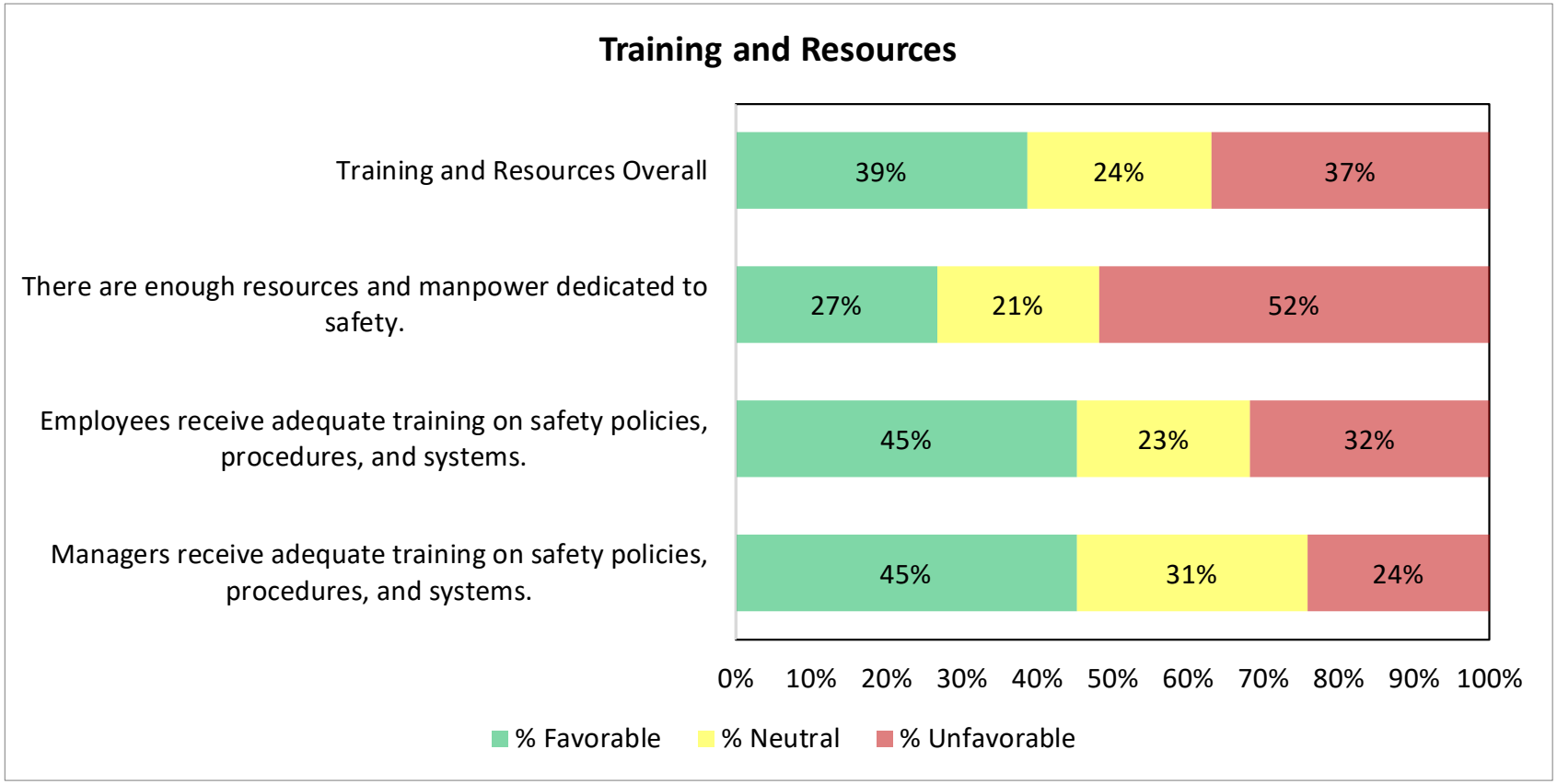
What, if anything, do you think prevents the reporting of safety concerns/incidents at AVS? (Select all that apply)

Reasons for Not Reporting	Percent of AVS Respondents
Belief that safety concerns/incidents will not be addressed	49%
Lack of awareness that there is a reporting process	38%
Fear of retribution	34%
Concern that the process is not confidential	30%
Reporting process is burdensome	24%
Lack of time	22%
Reporting process is confusing	20%
There are no incentives for reporting safety concerns/incidents	18%
Nothing prevents reporting	18%
Reporting process is difficult to use	16%
Other	11%

Item Results: Training and Resources

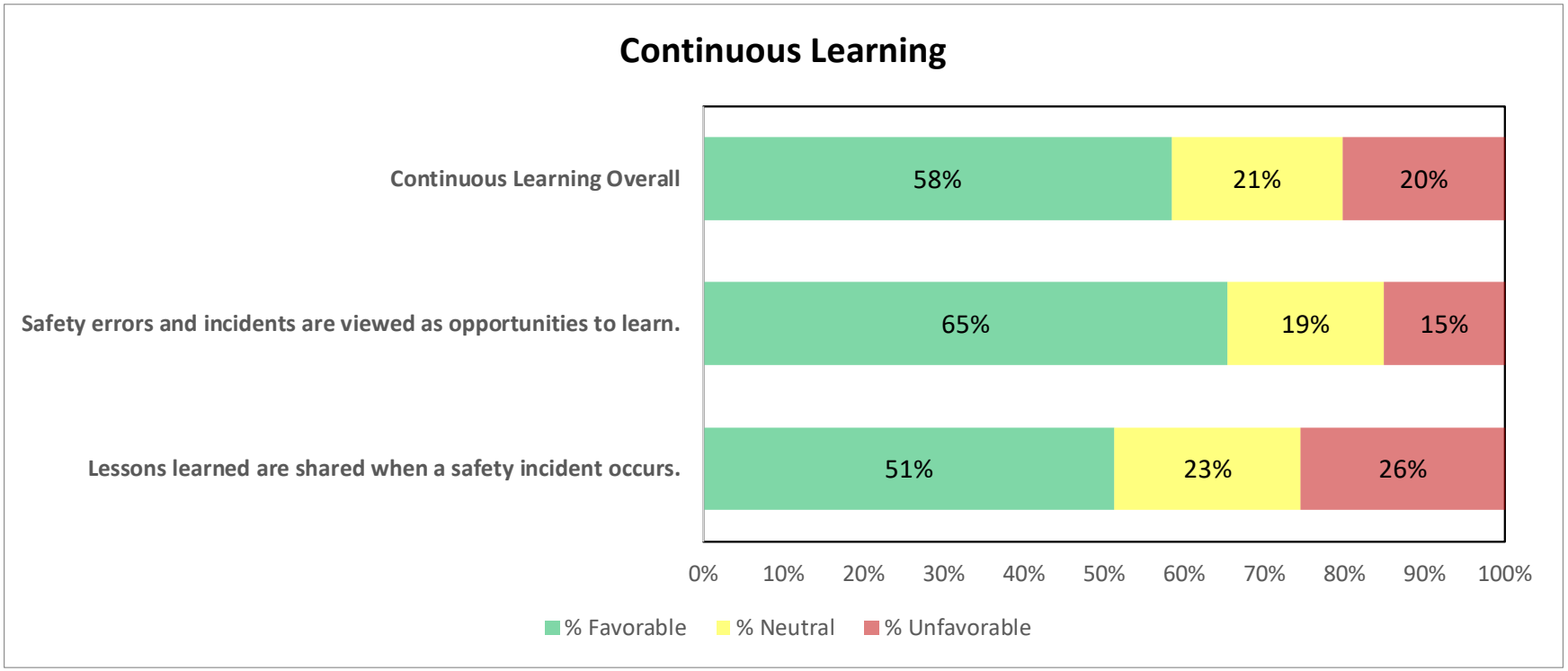
Resources and manpower dedicated to safety is the lowest rated question in the survey.

Employee and manager training on safety policies, procedures, and systems could be improved.



Item Results: Continuous Learning

Safety errors and incidents are viewed as opportunities to learn.
Less favorable ratings for sharing lessons learned when safety incidents occur.



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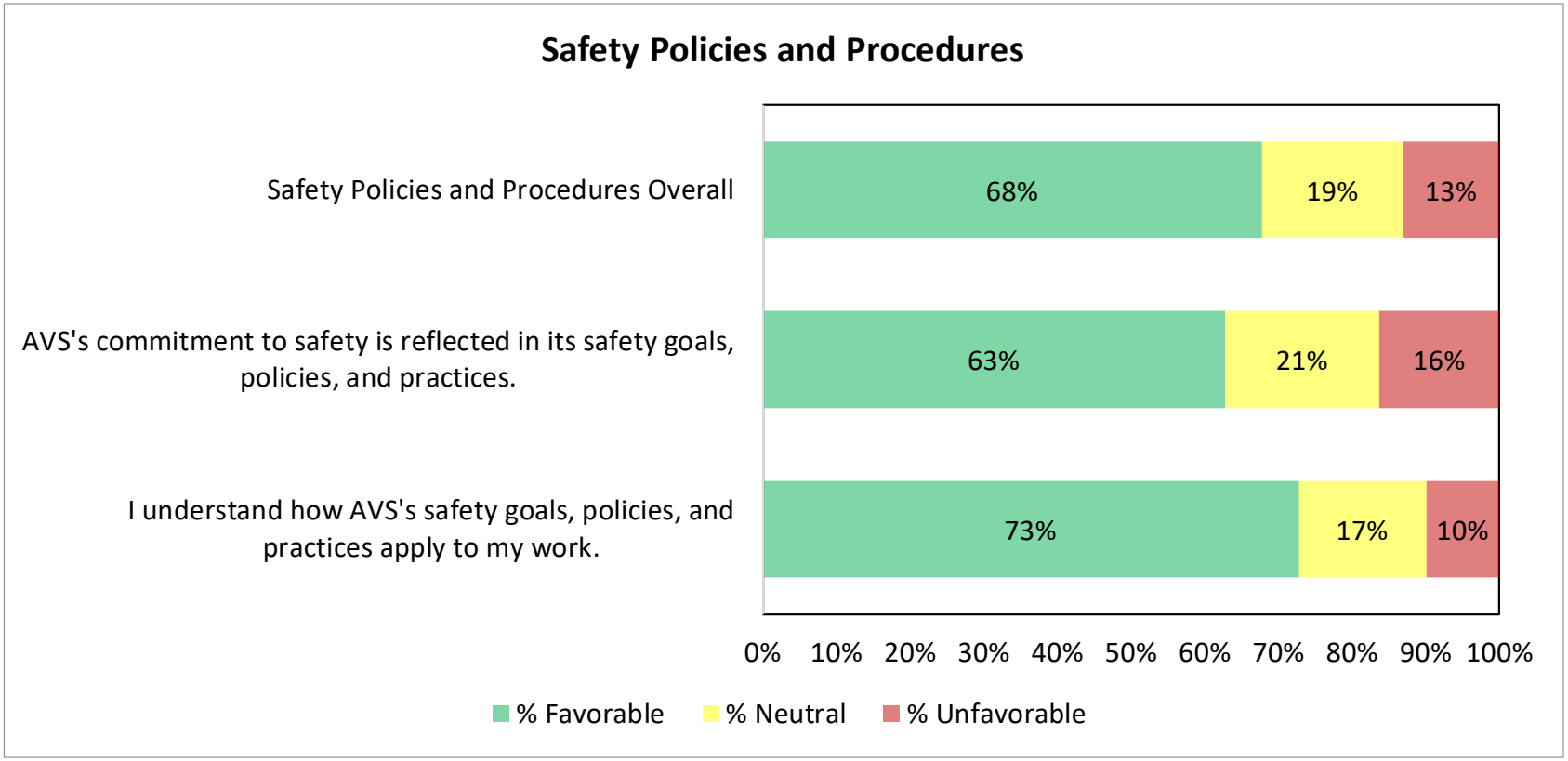
Item Results: Safety Policies and Procedures

The workforce understands how AVS's safety goals, policies, and procedures apply to their work.

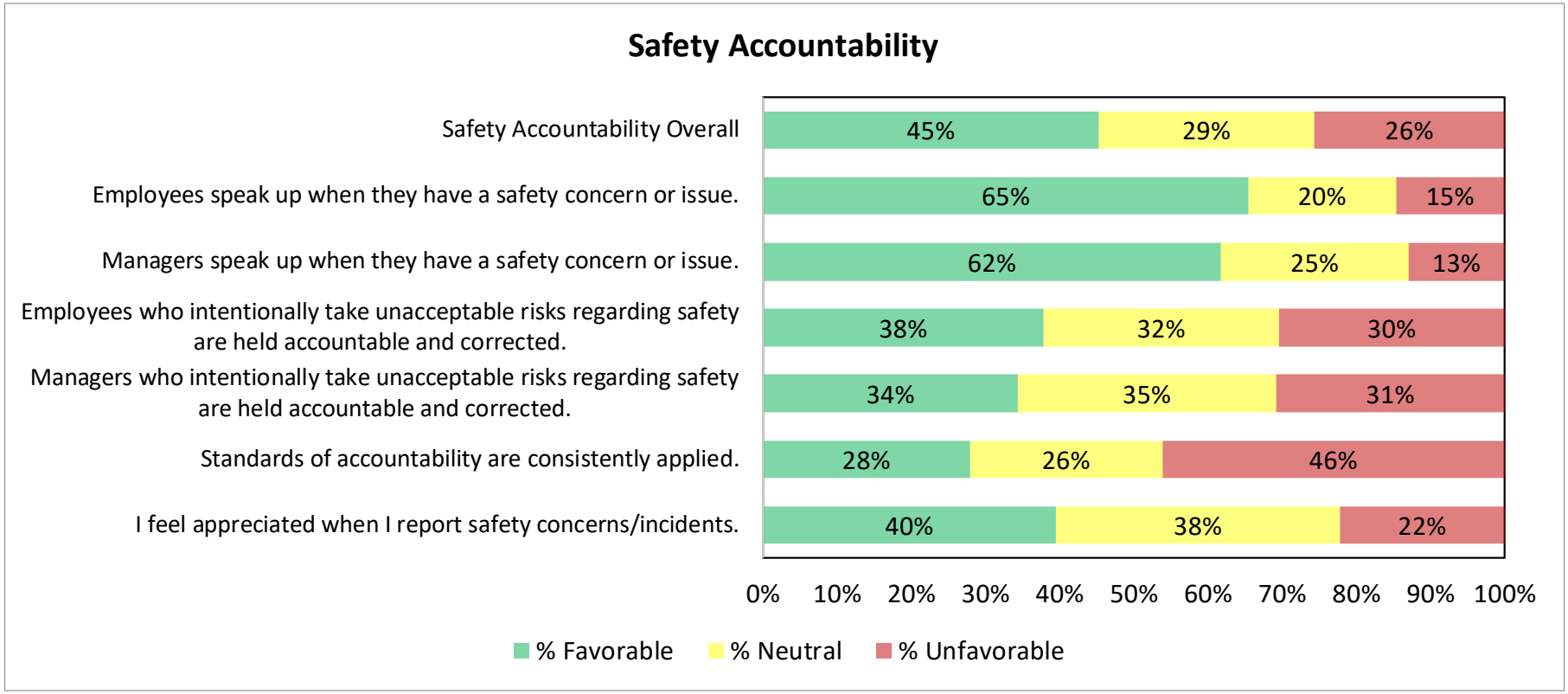


Item Results: Safety Accountability

Employees speak up when they have safety concerns/incidents; slightly lower for managers speaking up.

Standards of accountability are not consistently applied.

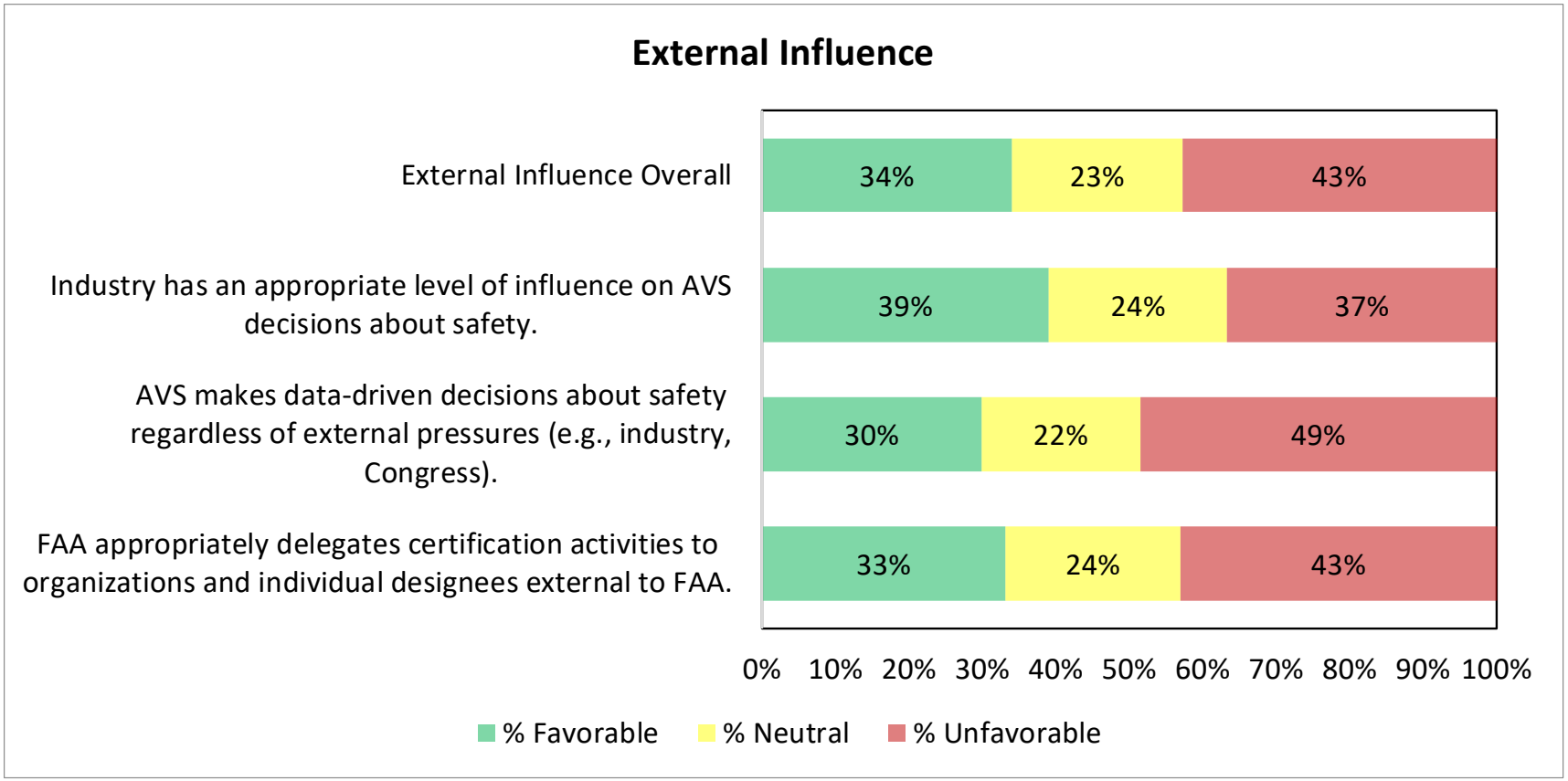
There is a lack of accountability for taking unacceptable risks regarding safety.



MITRE

Item Results: External Influence

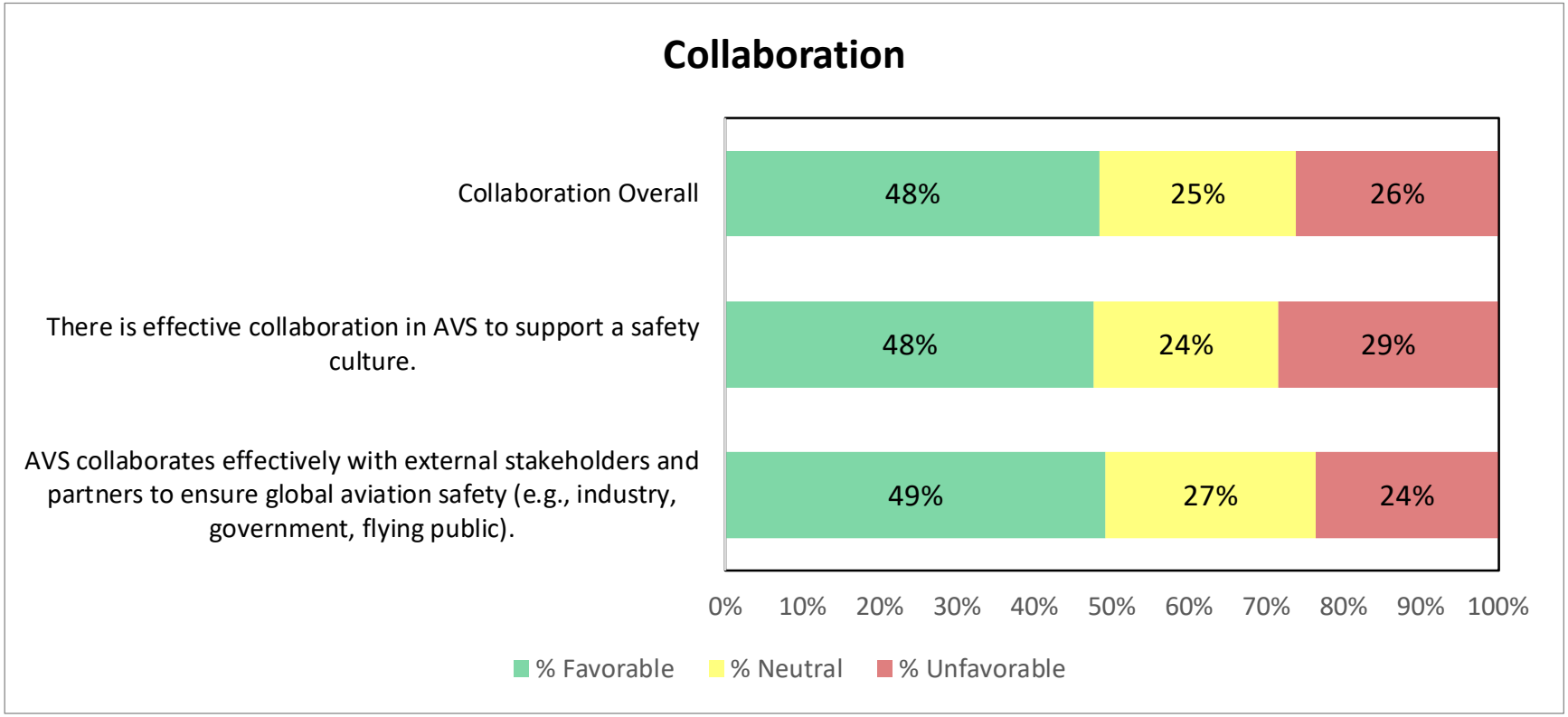
External Influence questions are among the lowest rated in the survey.



MITRE

Item Results: Collaboration

There is a need for better collaboration to promote a safety culture and ensure global aviation safety.



5. Summary of Survey Results by Service/Office

Overview of Service/Office Results

- This section of the report focuses on exploring differences in responses to the AVS Safety Culture Survey by Service/Office.
- The objective of this analysis is to determine whether key AVS-wide **strengths** and **opportunities for improvement** are **consistent** across AVS or exist only in certain Services/Offices.
  - Noting those Services/Offices that have the biggest challenges in the area may help to focus action planning efforts.
  - Noting Services/Offices that scored particularly high in the area may help to identify internal best practices.
- Cross-Service/Office results are presented for each AVS-wide Strength and Opportunity for Improvement.
- We identify the highest and lowest scoring Services/Offices for each key strength and opportunity for improvement based on whether there is a meaningful difference (versus a statistically significant difference) between the Service's/Office's score and the scores of other Services/Offices based on established thresholds.
- Due to their small sample size, there is less confidence in the results for the following Services/Offices: AVP, AOV, AQS, AUS. Results for these Services/Offices should be interpreted with that in mind.

Note: Results are not provided for ARM because less than 10 individuals from ARM responded to the survey. Results are not provided for the Office of the Associate Administrator for Aviation Safety because there are less than 10 individuals who work in this office.

Thresholds for Identifying Highest and Lowest Scoring Services/Offices

Highest Scoring	Lowest Scoring
Service/Office A	Service/Office B

FS and AIR*

- Highest Scoring: score is >= 5 percentage points higher than other Services/Offices.
- Lowest Scoring: score is >= 5 percentage points lower than other Services/Offices.

All Other Services/Offices

- Highest Scoring: score is >= 10 percentage points higher than other Services/Offices.
- Lowest Scoring: score is >= 10 percentage points lower than Other Services/Offices.

*FS and AIR have lower thresholds than the other Services/ Offices due to their large sample sizes.

MITRE

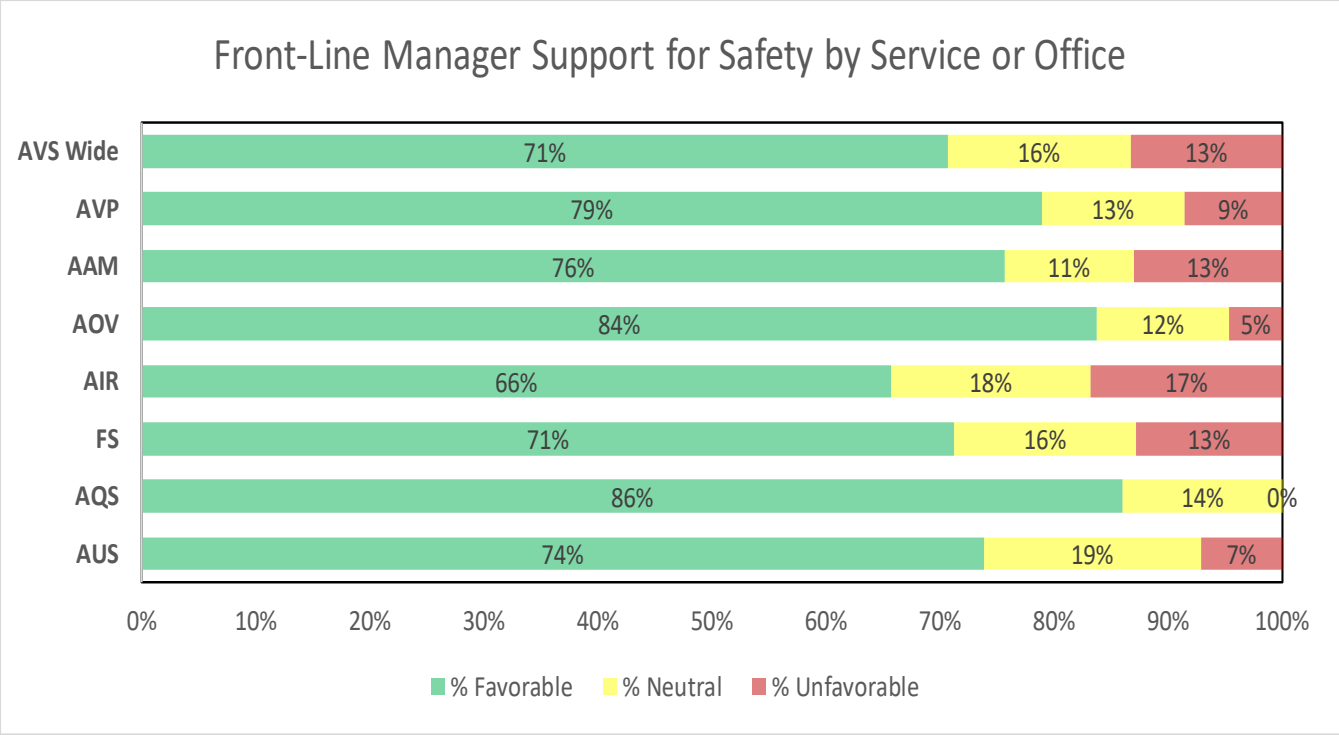
AVS-wide Strength #1:

Front-Line Managers demonstrate strong support for safety

Service/Office Results

Front-Line Managers across Services/Offices show strong support for safety (e.g., listen to and address employee safety issues).

Highest Scoring	Lowest Scoring
AOV AQS	AIR



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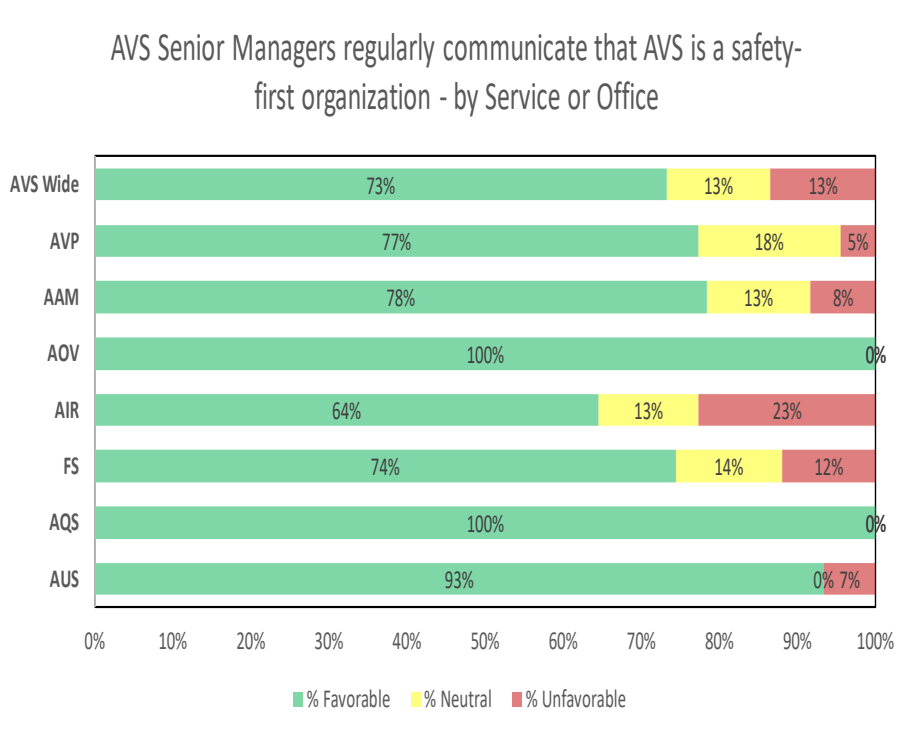
AVS-wide Strength #2

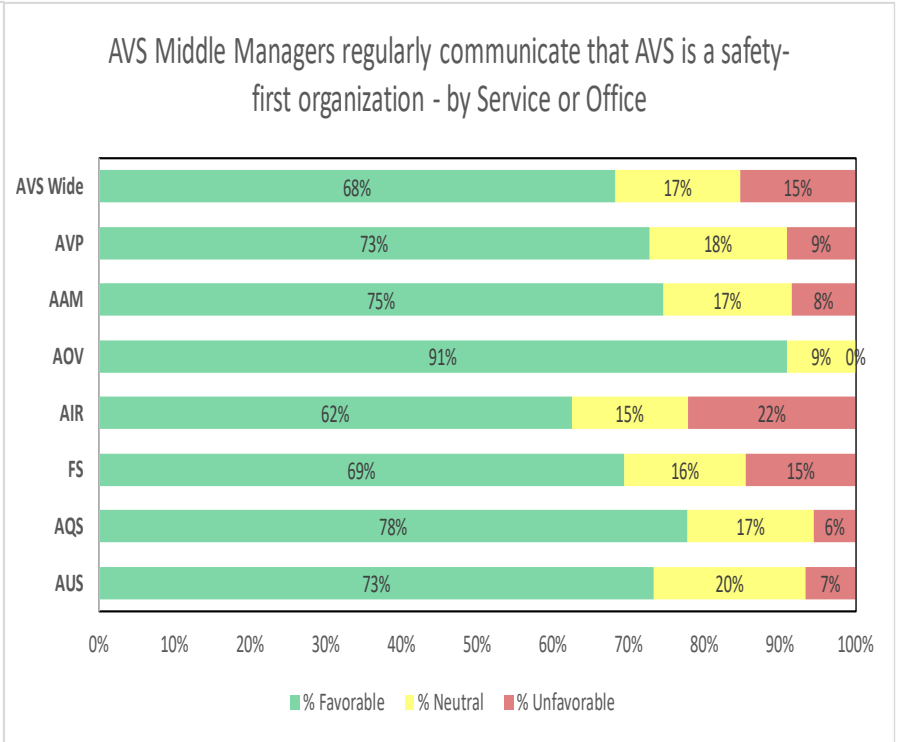
Senior/Middle Managers regularly communicate that AVS is a safety-first organization

Service/Office Results

The survey revealed that Senior and Middle Managers across Services/ Offices are doing a good job at communicating that AVS is safety-first organization.

Highest Scoring	Lowest Scoring
AOV AQS	AIR





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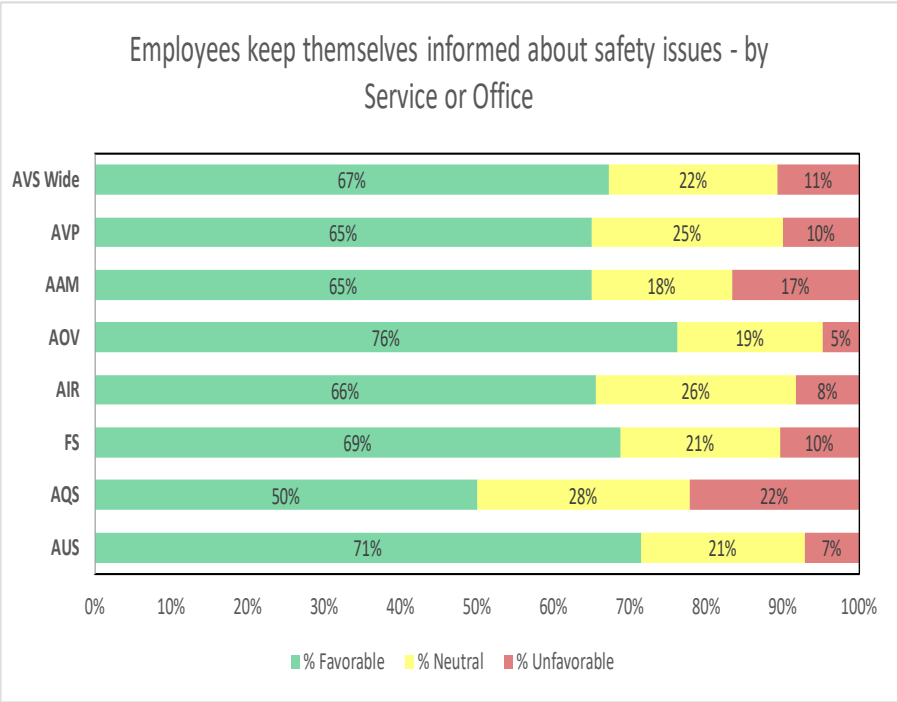
AVS-wide Strength #3

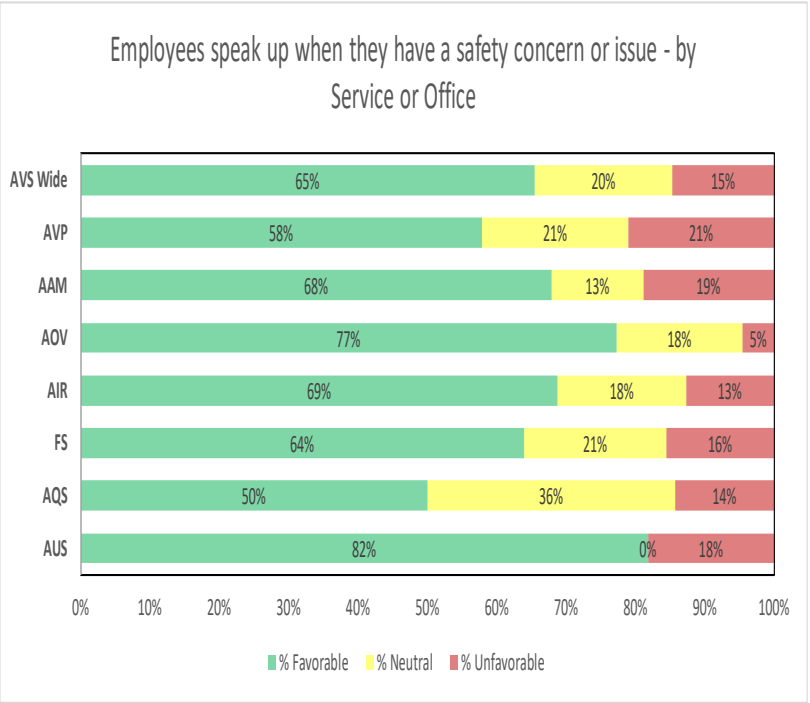
Employees are proactive in maintaining safety

Service/Office Results

Employees keeping themselves informed about safety issues and speaking up when they have safety concerns are strengths for most Services/Offices.

Highest Scoring	Lowest Scoring
AOV AUS (speaking up)	AQS





MITRE

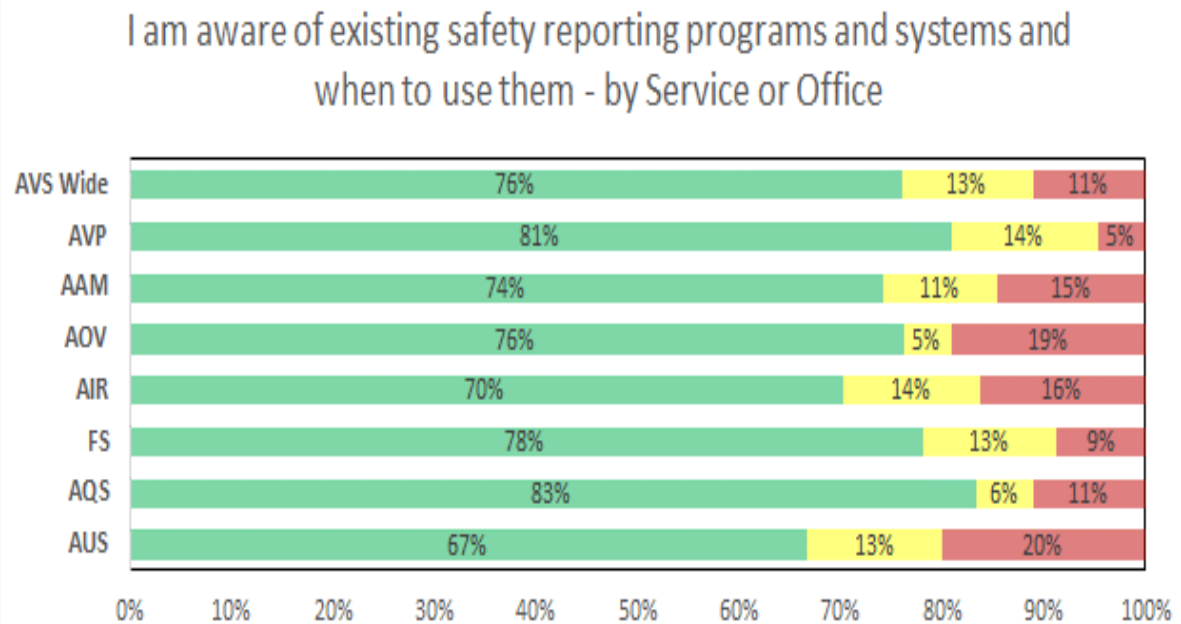
AVS-wide Strength #4

There is awareness about existing safety reporting programs and when to use them

Service/Office Results

Survey respondents across Services/Offices reported they are aware of existing safety reporting programs and systems.

Highest Scoring	Lowest Scoring
N/A	N/A



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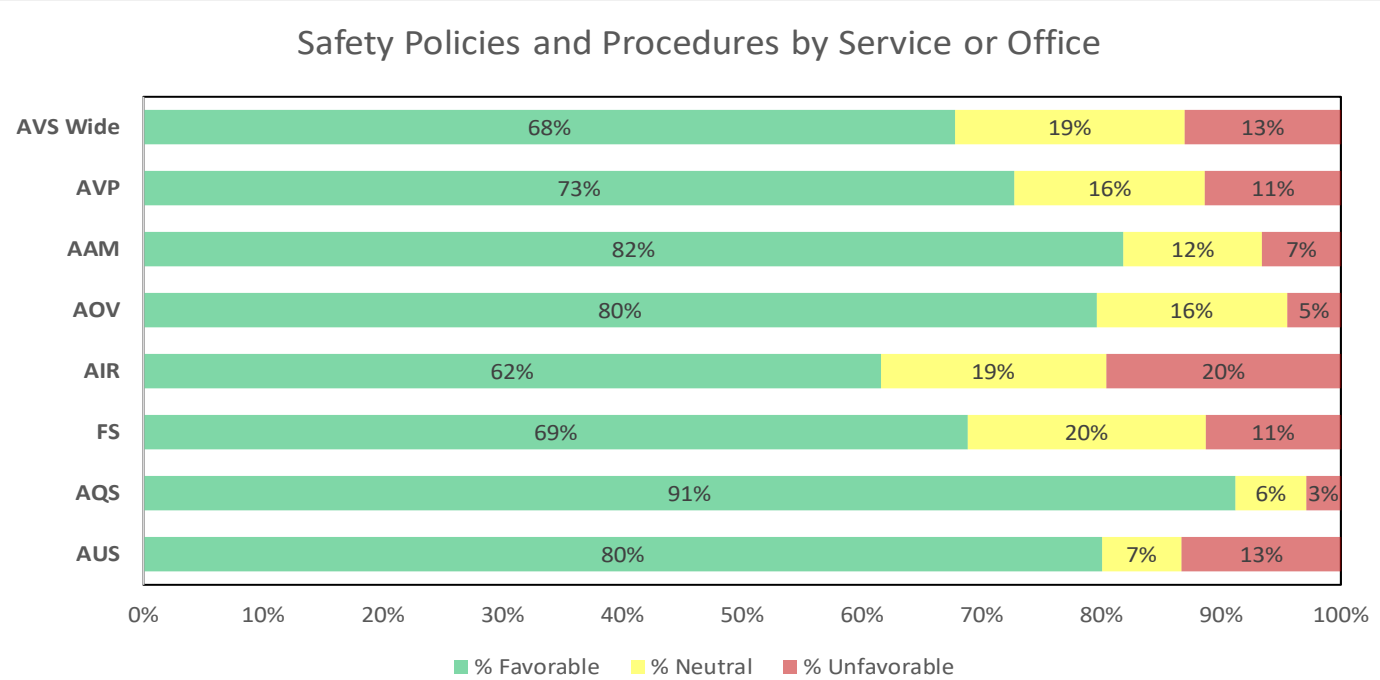
AVS-wide Strength #5

Safety Policies/procedures accurately reflect AVS's commitment to safety and employees understand how they apply to their work

Service/Office Results

Safety policies/procedures is a strength for most Services/Offices.

Highest Scoring	Lowest Scoring
AQS	AIR



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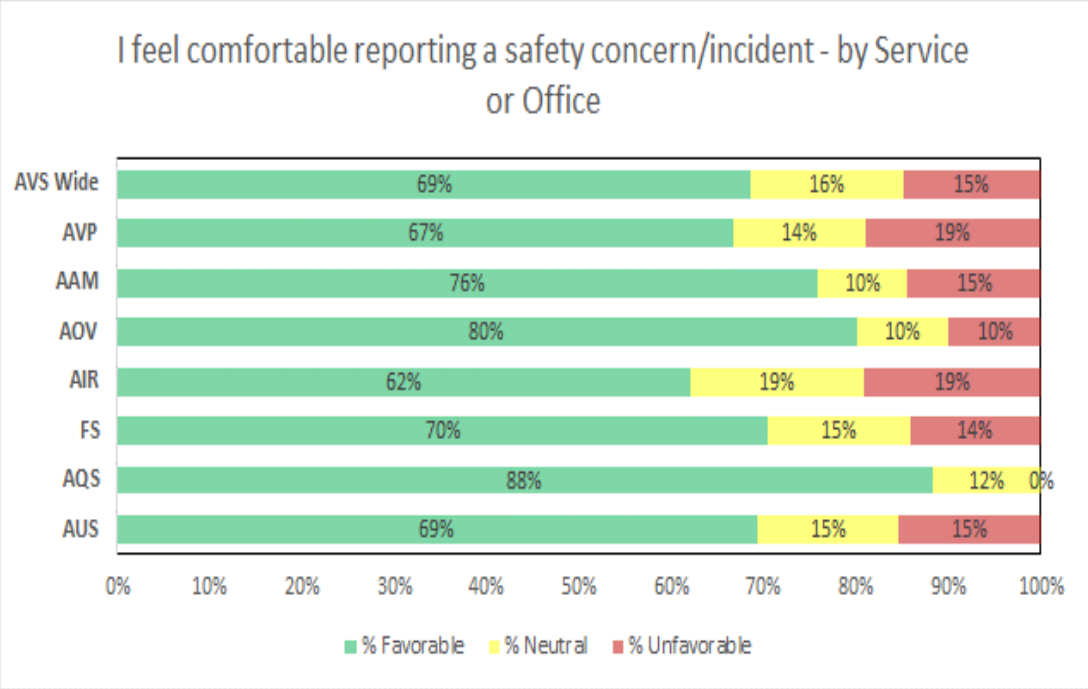
AVS-wide Strength #6

There is comfort in reporting safety concerns and encouragement to do so

Service/Office Results

Survey respondents across Services/Offices feel comfortable reporting safety concerns/incidents, although AIR respondents provided less favorable responses.

Highest Scoring	Lowest Scoring
AOV AQS	AIR



MITRE

AVS-wide Opportunity for Improvement #1

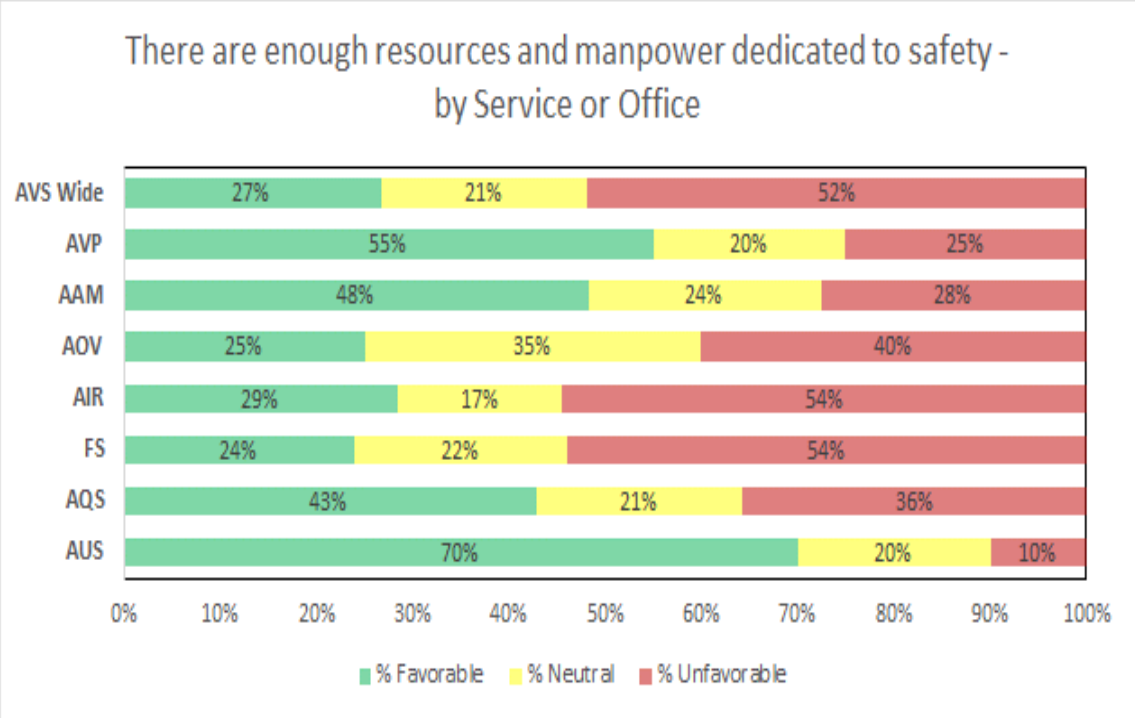
There are not enough resources, manpower, and training dedicated to safety (1 of 2)

Service/Office Results

Insufficient resources and manpower dedicated to safety is an opportunity for improvement for most Services/Offices.

AOV, AIR, and FS have the biggest challenges in resources and manpower.

Highest Scoring	Lowest Scoring
AUS	FS AOV AIR



MITRE

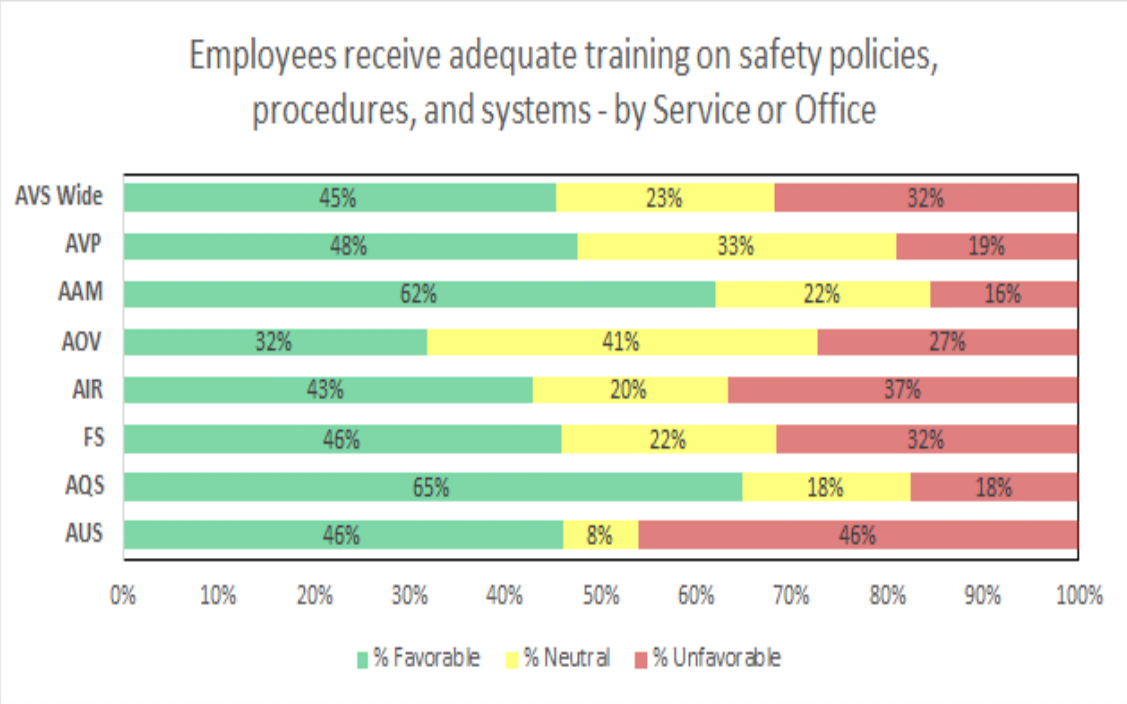
AVS-wide Opportunity for Improvement #1

There are not enough resources, manpower, and training dedicated to safety (2 of 2)

Service/Office Results

Inadequate training on safety policies, procedures and systems is an opportunity for improvement for many Services/Offices, with the exception of AAM and AQS.

Highest Scoring	Lowest Scoring
AAM AQS	AOV



MITRE

AVS-wide Opportunity for Improvement #2

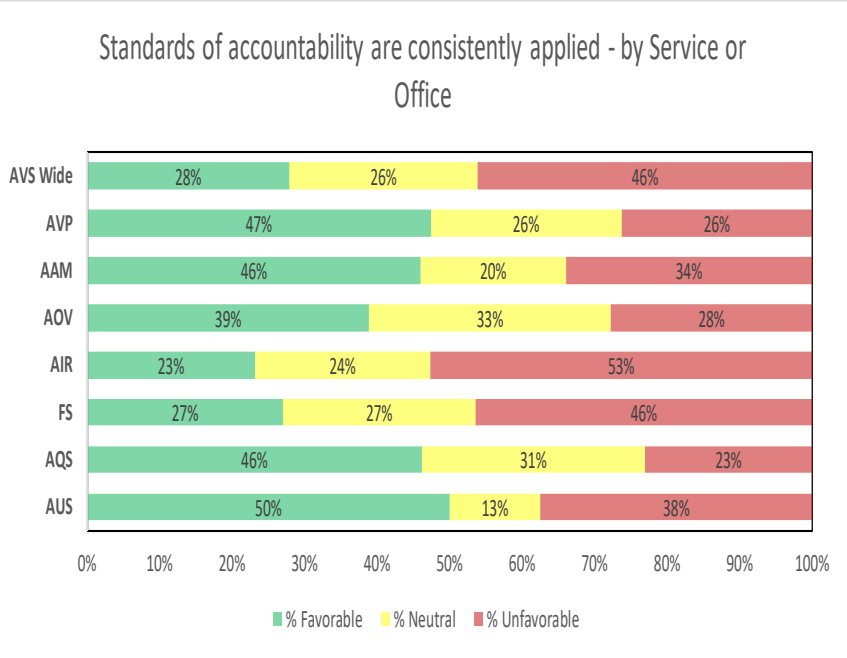
There is a lack of accountability for safety-related decisions and actions (1 of 2)

Service/Office Results

Lack of consistency in how standards of accountability are applied is an opportunity for improvement for all Services/Offices.

AIR and FS have the biggest challenges around safety accountability.

Highest Scoring	Lowest Scoring
N/A	AIR FS



MITRE

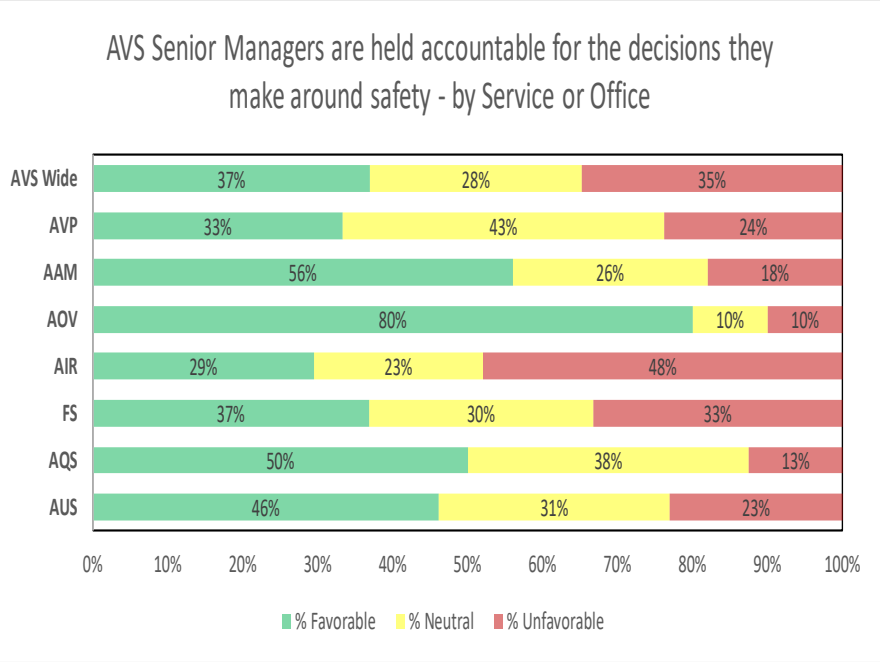
AVS-wide Opportunity for Improvement #2

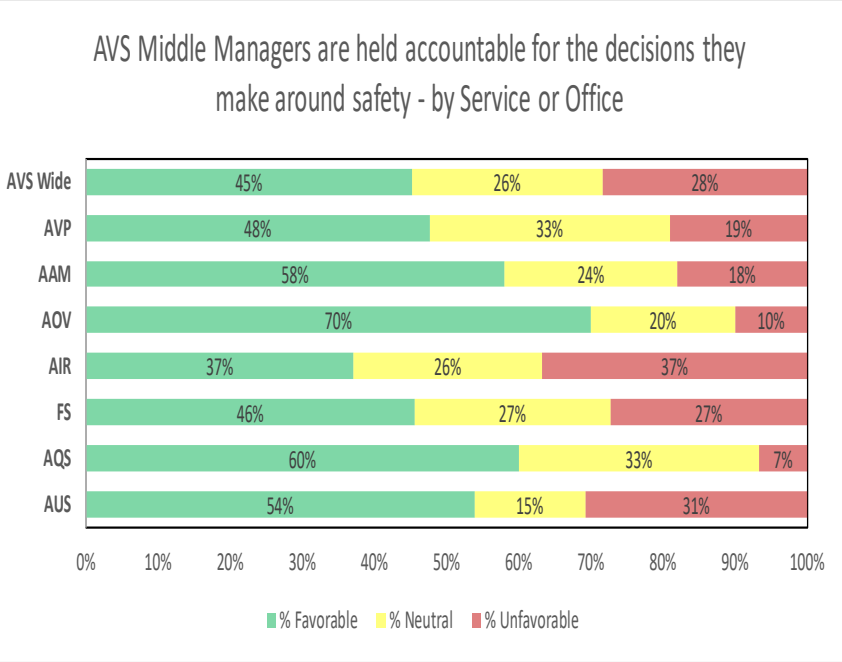
There is a lack of accountability for safety-related decisions and actions (2 of 2)

Service/Office Results

Holding leaders accountable for safety-related decisions is an opportunity for improvement for AVP, AIR, FS, and AUS.

Highest Scoring	Lowest Scoring
AOV	AIR FS AVP





MITRE

AVS-wide Opportunity for Improvement #3

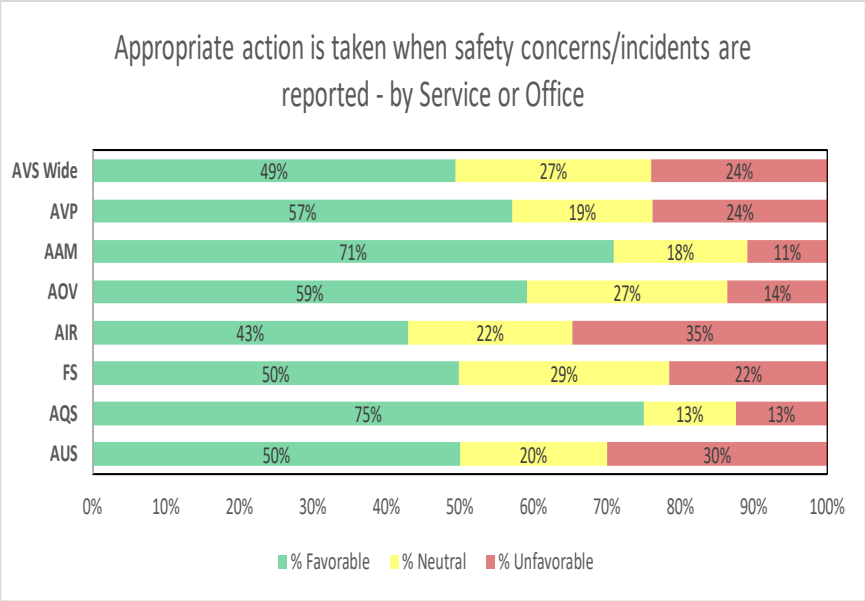
There is a perceived lack of action and feedback in response to reported safety issues/concerns

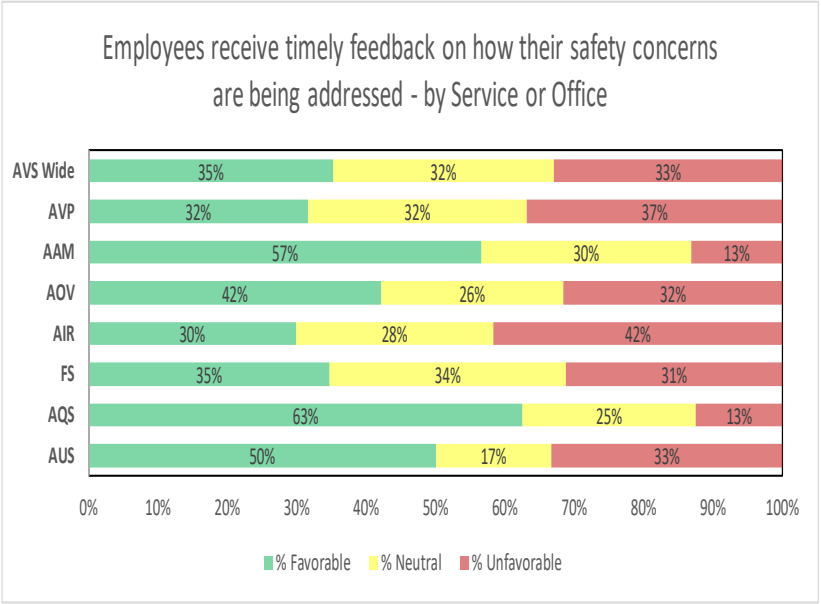
Service/Office Results

Lack of action in response to reported safety concerns/incidents is the biggest challenge for AIR.

Survey respondents in many Services/Offices do not believe timely feedback is provided on how reported safety concerns are being addressed.

Highest Scoring	Lowest Scoring
AAM AQS	AIR





MITRE

AVS-wide Opportunity for Improvement #4

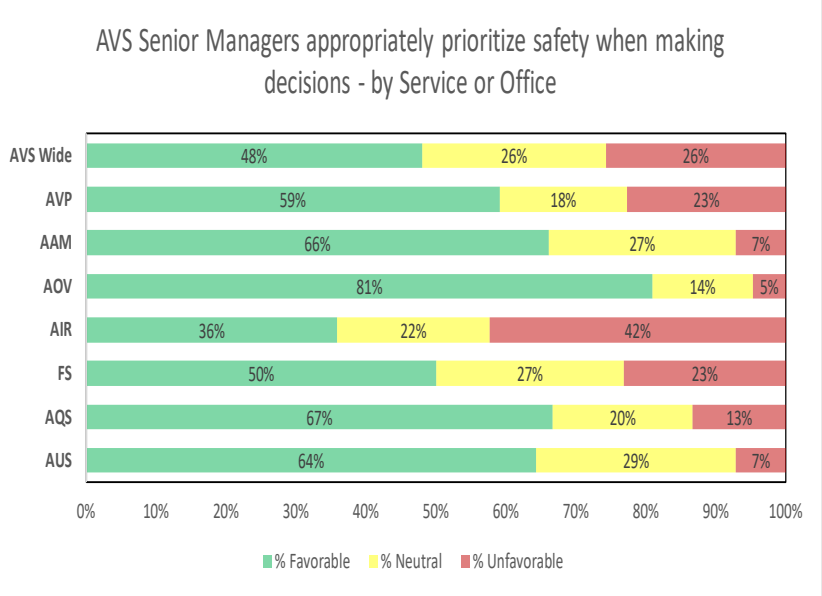
There are opportunities for leadership to demonstrate an even stronger commitment to safety through their actions

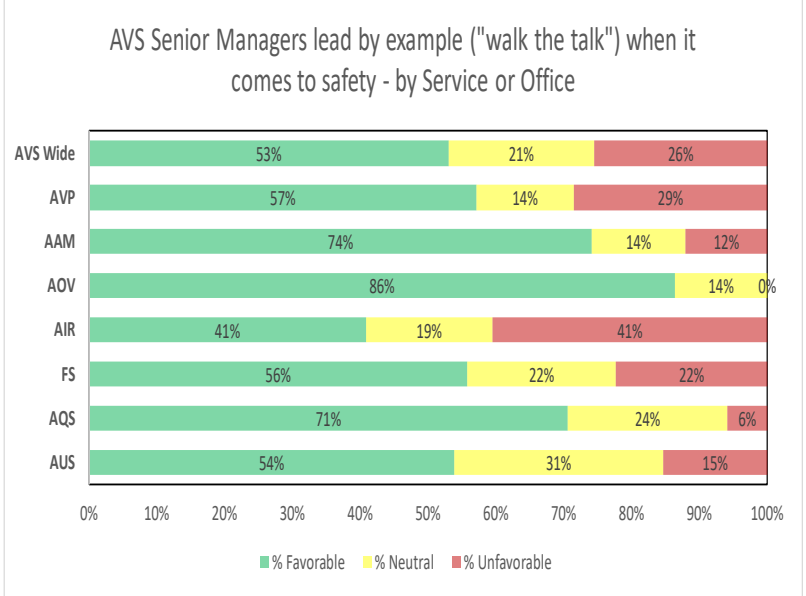
Service/Office Results

Perceptions of Senior Manager commitment to safety vary across Services/Offices.

Respondents from AIR provided the least favorable perceptions of Senior Manager commitment to safety.

Highest Scoring	Lowest Scoring
AOV AAM AQS	AIR





MITRE

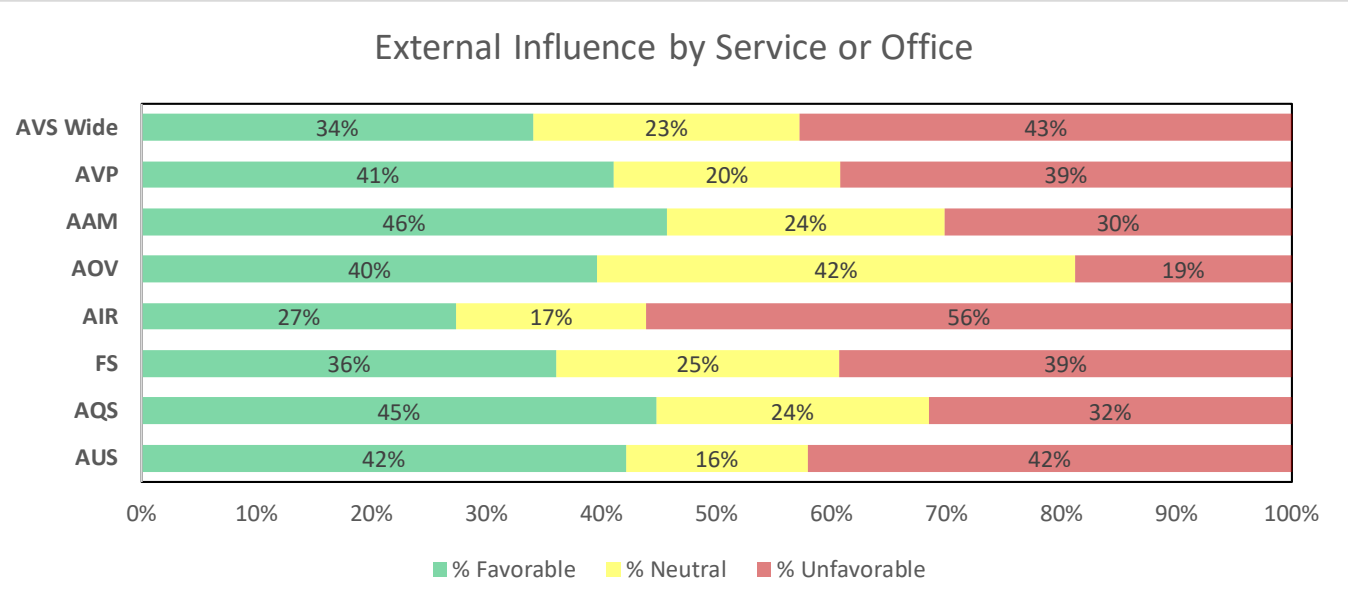
AVS-wide Opportunity for Improvement #5

External pressures (e.g., industry) is perceived to get in the way of safety decisions

Service/Office Results

External influence is an opportunity for improvement for all Services/ Offices.

Highest Scoring	Lowest Scoring
N/A	AIR FS



MITRE

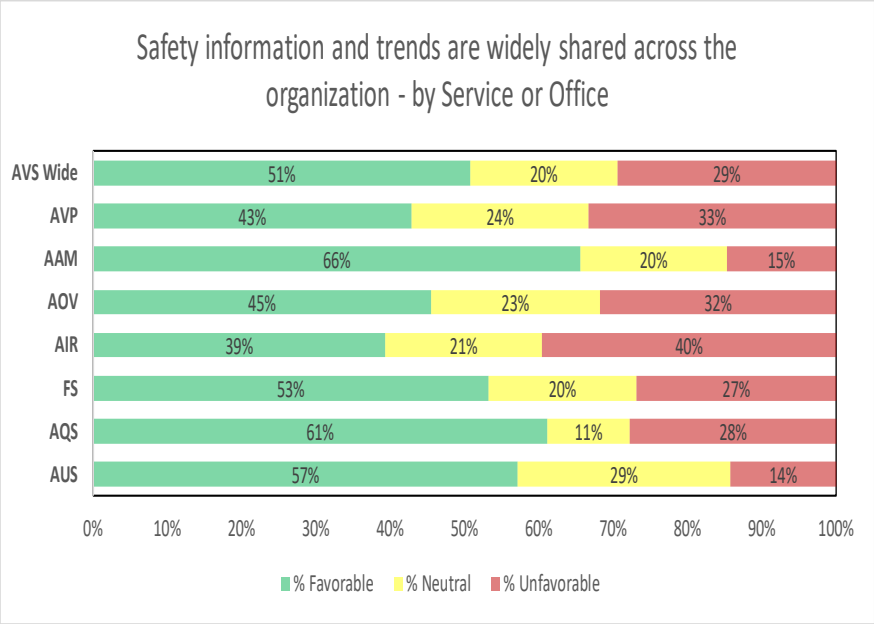
AVS-wide Opportunity for Improvement #6

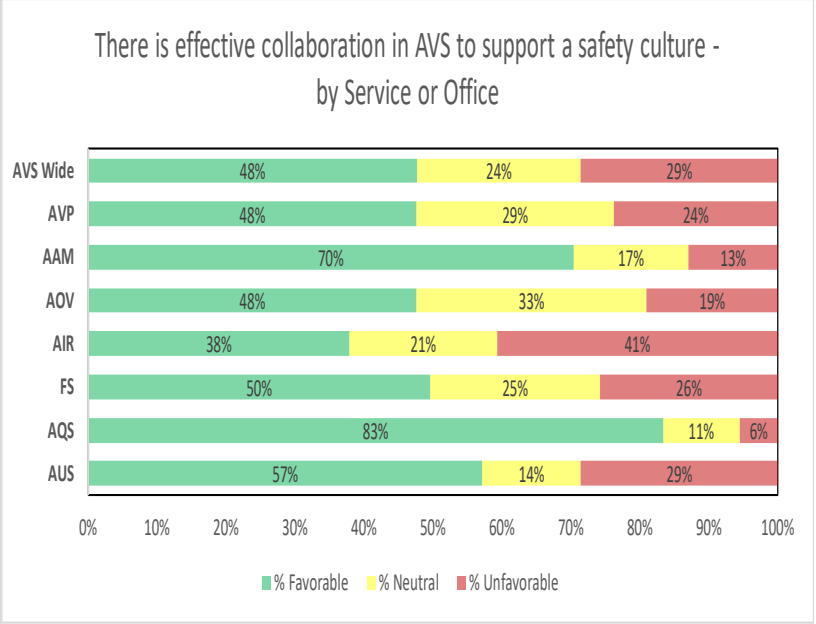
Collaboration and sharing of information within AVS to promote safety could be improved

Service/Office Results

Perceptions of widely sharing safety-related information and collaboration within AVS vary across Services/Offices.

Highest Scoring	Lowest Scoring
AAM AQS	AIR





MITRE

AVS-wide Opportunity for Improvement #7

Fear of retribution was a frequently cited factor that prevents employees from reporting safety issues

Service/Office Results

Fear of retribution was frequently cited as a factor that may prevent the reporting of safety issues/concerns by survey respondents across Services/Offices.

AAM survey respondents were the least likely to report that fear of retribution prevents the reporting of safety issues/concerns.

Percent of Survey Respondents who Selected Fear of Retribution as One Factor that May Prevent the Reporting of Safety Concerns/Incidents

AVS-wide	AVP	AAM	AOV	AIR	FS	AQS	AUS
34%	32%	23%	36%	38%	32%	33%	27%

6. Summary of Survey Results by Level

Survey Responses By Level

Level	Number of Responses
AVS Overall	**1814**
Non-Manager (Employee)	1339
Front-Line Manager	142
Middle Manager	92
Senior Manager	26
Missing (Respondents did not Identify their level in the survey)	215

Due to the small sample size, there is less confidence in the results for Senior Managers, and results for Senior Managers should be interpreted with that in mind.

Survey Results by Level

- This section of the report focuses on exploring differences in survey responses by level: **Non-Manager, Front-Line Manager, Middle Manager, Senior Manager**.
- The objective of this analysis is to determine the extent to which AVS-wide strengths and opportunities for improvement are consistent across levels.
- In general, non-managers (employees) provided less favorable opinions about the AVS safety culture than managers, which is a typical survey finding. However, non-managers responded favorably in 5 of the 6 areas that were identified as AVS strengths, including:
  - Front-Line Managers demonstrating strong support for safety
  - Senior and Middle Managers regularly communicating that AVS is a safety-first organization
  - Awareness about existing safety reporting programs and when to use them
  - Employees being proactive in maintaining safety (e.g., keeping themselves informed about safety issues, speaking up when there is a safety concern)
  - Comfort in reporting safety issues/concerns
- The remaining slides in this section show the survey results by level for the **AVS-wide opportunities for improvement.**

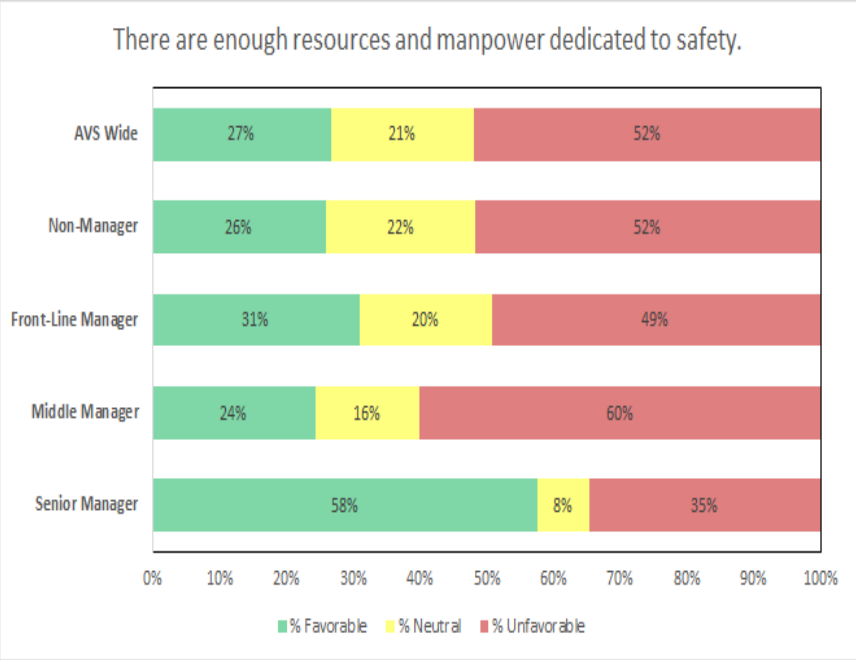
AVS-wide Opportunity for Improvement #1

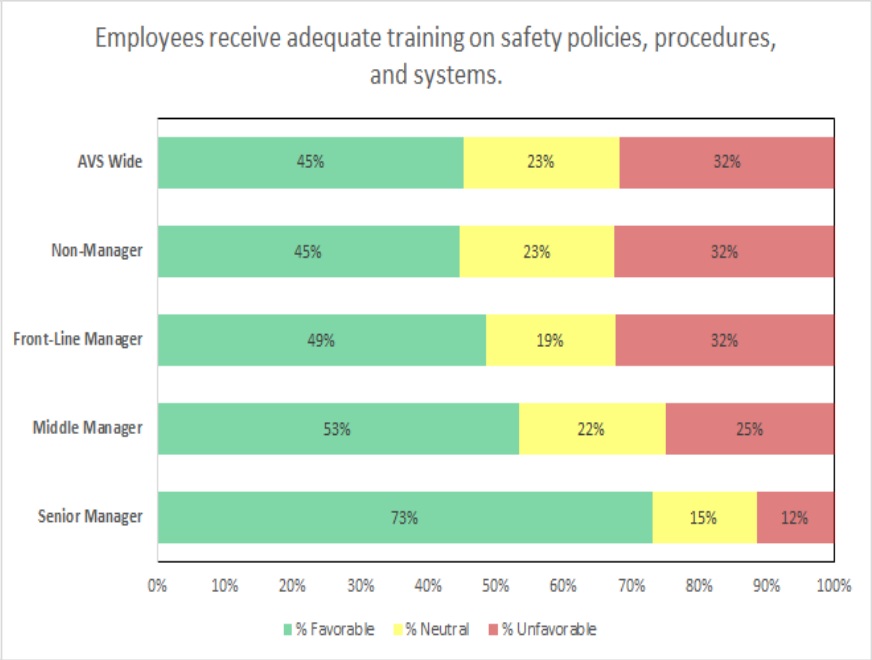
There are not enough resources, manpower, and training dedicated to safety

Level Results

Respondents at all levels felt there are not enough resources and manpower dedicated to safety; however Senior Managers had mixed responses.

Non-managers and Front-Line Managers had the least favorable opinions about safety-related training.





MITRE

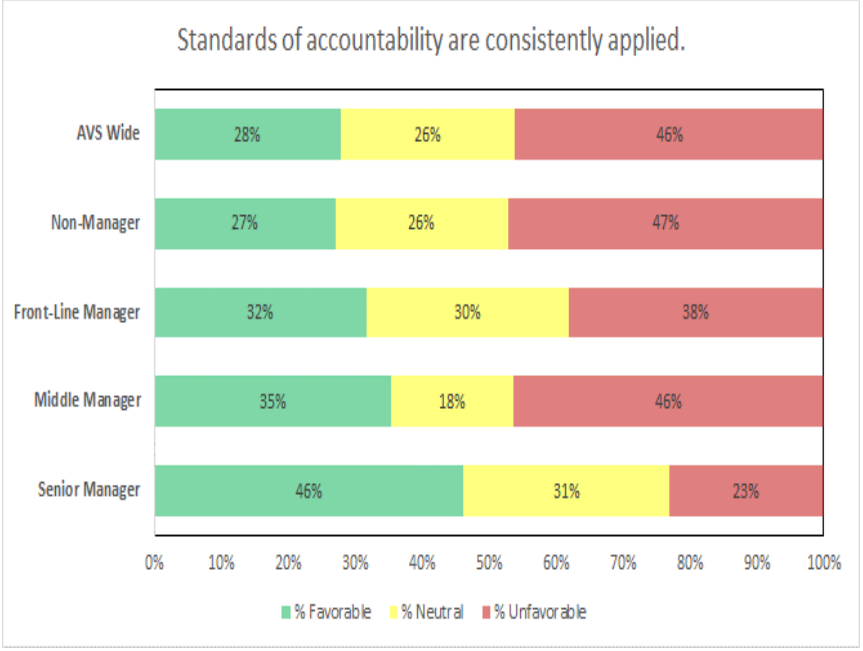
AVS-wide Opportunity for Improvement #2

There is a lack of accountability for safety-related decisions and actions (1 of 2)

Level Results

Lack of accountability for intentionally taking unnecessary risks regarding safety and inconsistency in how standards of accountability are applied are opportunities for improvement for all levels.

Non-managers had the least favorable opinions about safety accountability.



MITRE

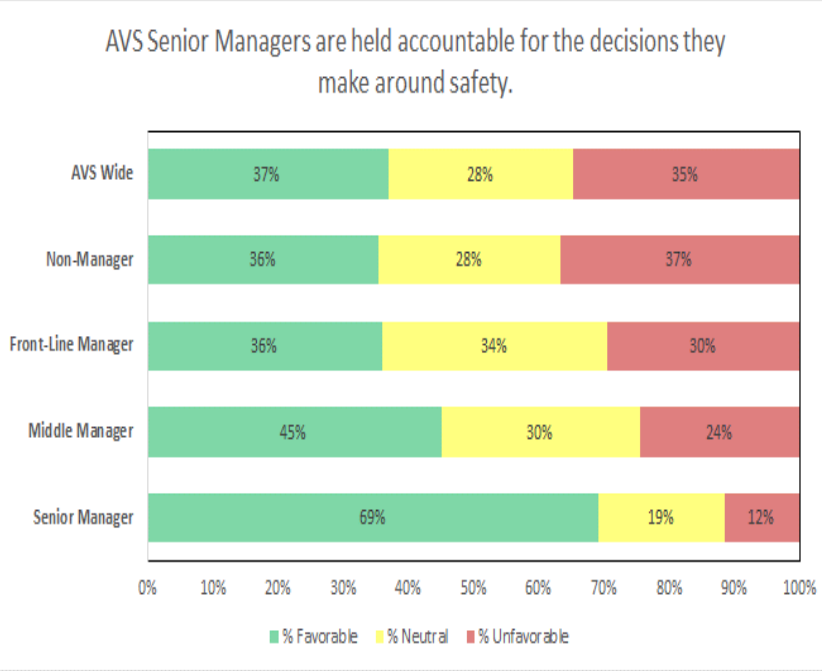
AVS-wide Opportunity for Improvement #2

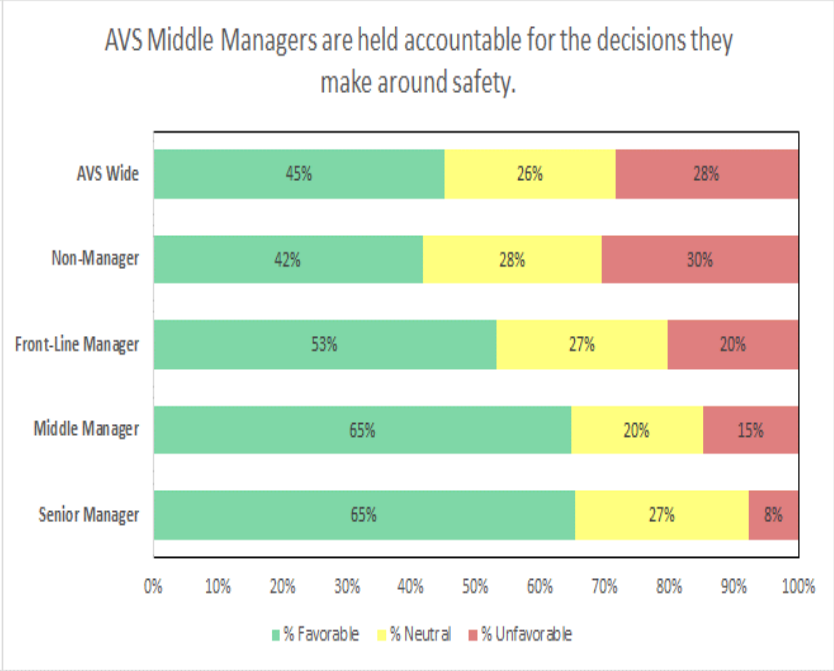
There is a lack of accountability for safety-related decisions and actions (2 of 2)

Level Results

Non-managers, Front-Line Managers, and Middle Managers do not believe that AVS Senior Managers are held accountable for safety-related decisions.

Non-Managers provided the least favorable opinions about Middle Managers being held accountable for safety-related decisions.





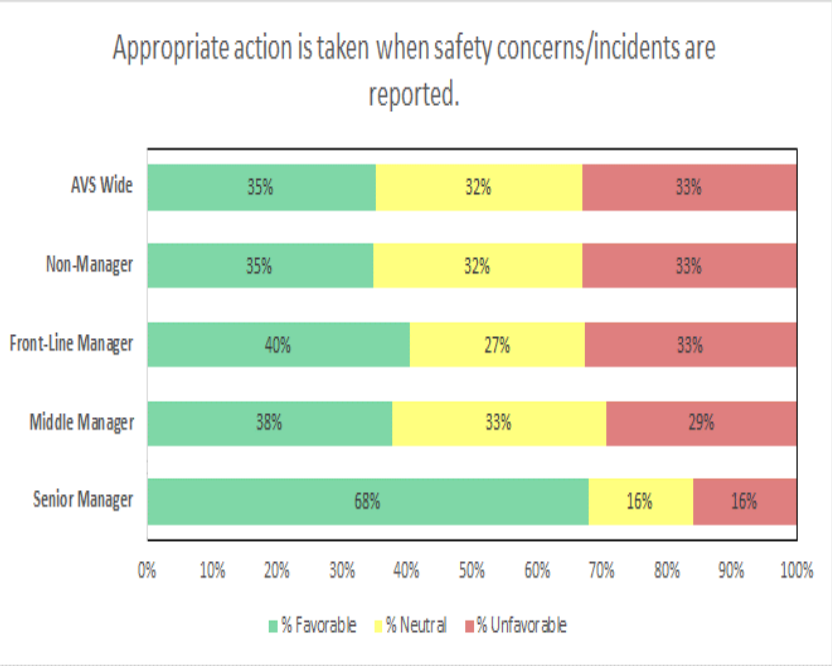
MITRE

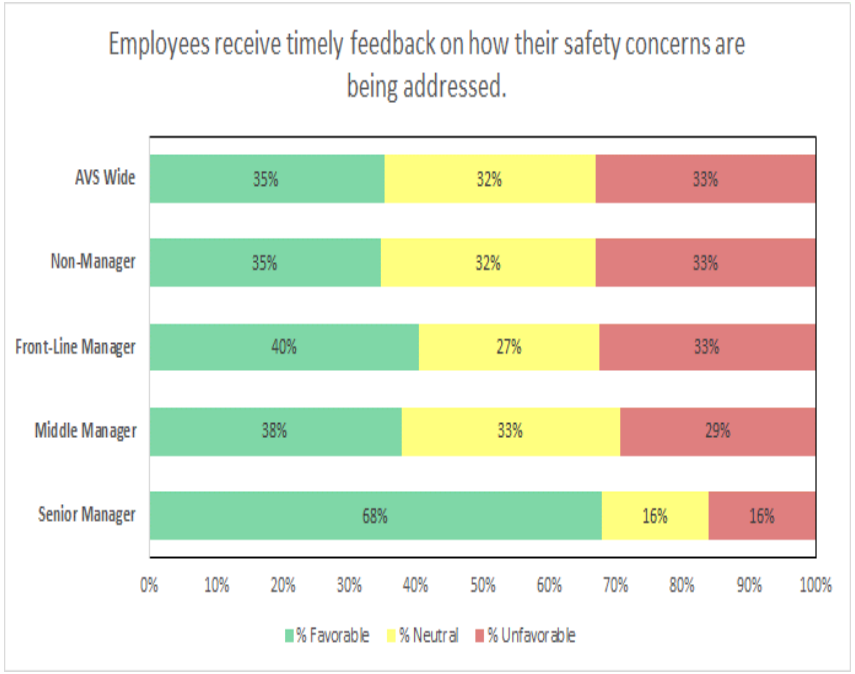
AVS-wide Opportunity for Improvement #3

There is a perceived lack of action and feedback in response to reported safety issues/concerns

Level Results

Individuals at all levels, with the exception of Senior Managers, do not believe that action is taken or feedback is provided when safety concerns/incidents are reported.





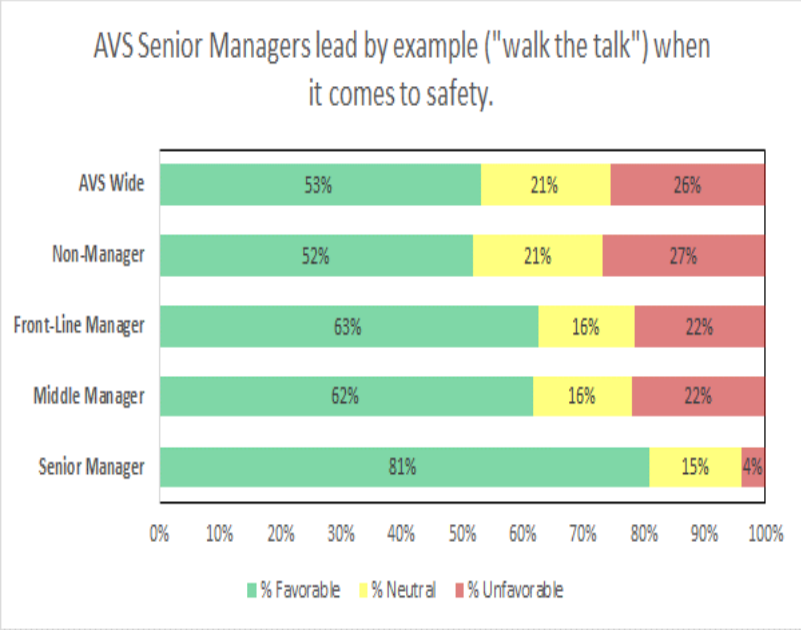
MITRE

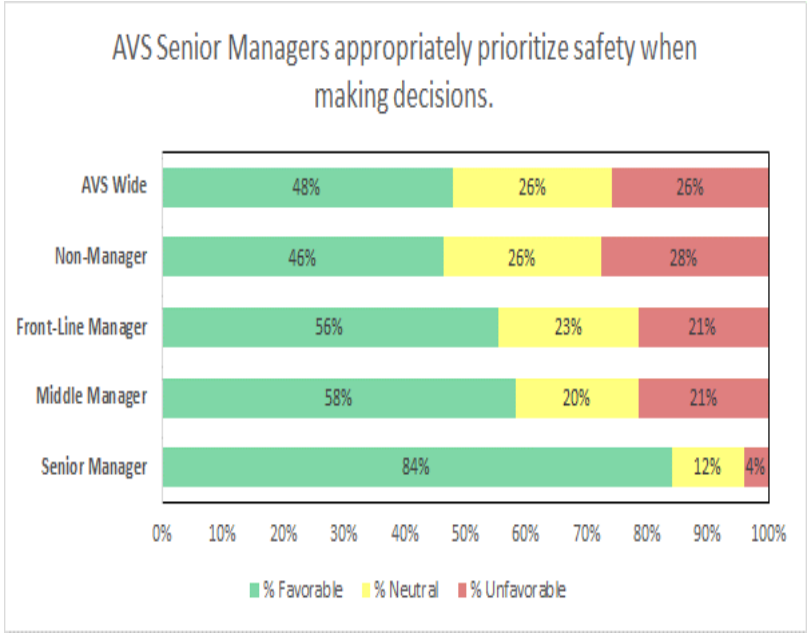
AVS-wide Opportunity for Improvement #4

There are opportunities for leadership to demonstrate an even stronger commitment to safety through their actions

Level Results

Non-managers had the least favorable perceptions of Senior Manager commitment to safety ("walking the talk" and prioritizing safety when making decisions).





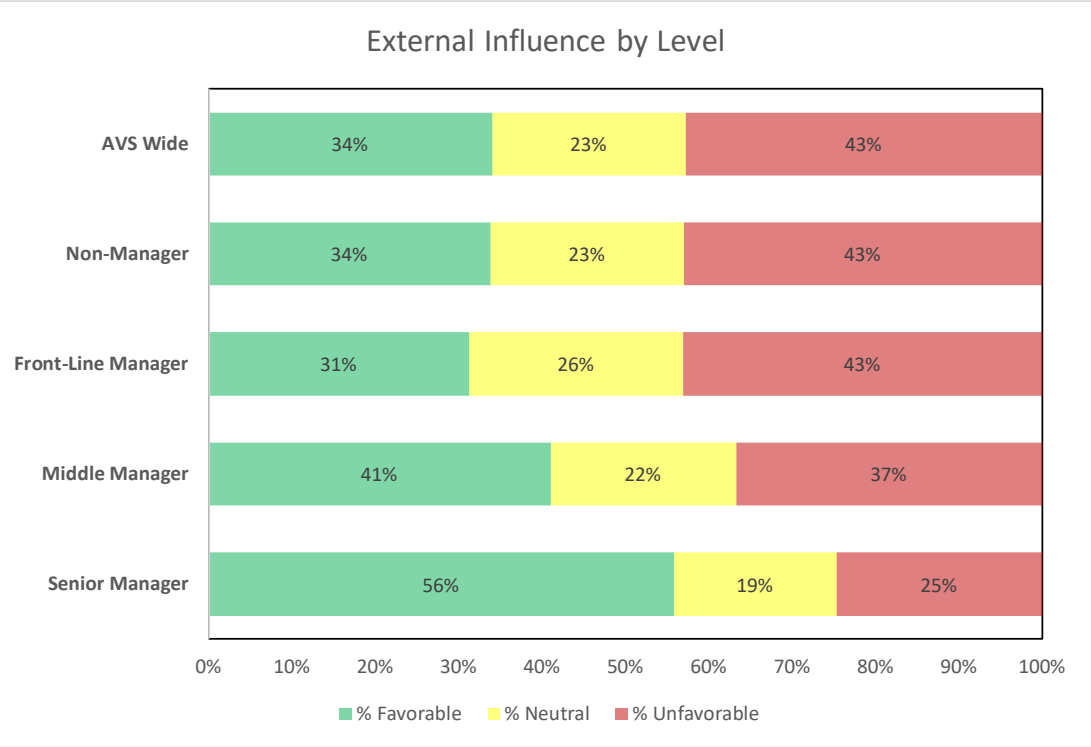
MITRE

AVS-wide Opportunity for Improvement #5

External pressures (e.g., industry) are perceived to get in the way of safety decisions

Level Results

External pressure was viewed as a challenge by all levels (although Senior Managers provided the most favorable responses).



MITRE

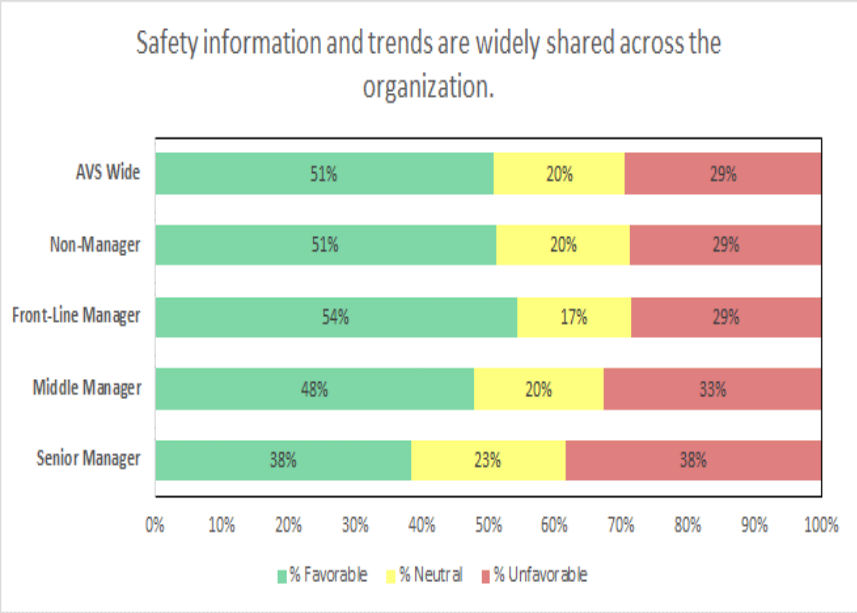
AVS-wide Opportunity for Improvement #6

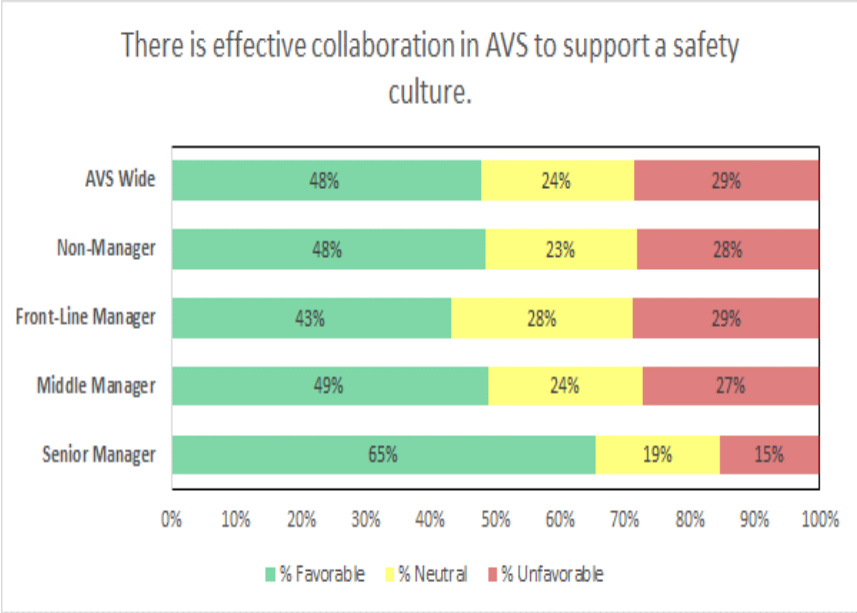
Collaboration and sharing of information within AVS to promote safety could be improved

Level Results

Senior Managers had the least favorable perceptions of the extent to which safety information and trends are widely shared across AVS.

Effective collaboration in AVS is viewed as an opportunity for improvement by all levels, except for Senior Managers.





MITRE

AVS-wide Opportunity for Improvement #7

Fear of retribution was a frequently cited factor that prevents employees from reporting safety issues

Level Results

Non-managers were more likely than managers to cite fear of retribution as a factor that may prevent reporting of safety concerns/incidents.

Percentage of Survey Respondents who Selected Fear of Retribution as One Factor that May Prevent the Reporting of Safety Concerns/Incidents

Non-Managers	Front-Line Managers	Middle Managers	Senior Managers
34%	11%	9%	5%

7. Summary of Survey Results by Tenure

Survey Responses By Tenure

Tenure	Number of Responses
AVS Overall	**1814**
Less than 1 year	24
1 year to less than 3 years	88
3 years to less than 5 years	173
5 years to less than 10 years	296
10 years to less than 20 years	651
20 years or more	372
Missing (Respondents did not Identify their tenure in the survey)	210

Note: Due to the small sample size, there is less confidence in the results for respondents with less than one year of tenure, and results for less than one year of tenure should be interpreted with that in mind.

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Survey Results by Tenure

- This section of the report focuses on exploring differences in responses to the AVS Safety Culture Survey by tenure at FAA, ranging from less than one year to over 20 years.
- In general, survey respondents with **less than three years** tenure at FAA had the **most favorable opinions** about the AVS safety culture, and those with **10 years or more tenure** with FAA had the **least favorable** opinions (a typical survey finding).
- Survey responses were favorable across all tenure groups regarding:
  - Front-line Manager support for safety
  - Senior and Middle Managers regularly communicating that AVS is a safety-first organization
  - Employees being proactive in maintaining safety (keeping themselves informed about safety issues, speaking up when they have a safety concern)
  - Comfort in reporting safety issues/concerns
  - Awareness of existing safety programs and when to use them
- The most notable gaps between the opinions of newer employees and those working at FAA for **more than 10** years were:
  - AVS Senior/Middle Managers appropriately prioritizing safety when making decisions
  - Accountability for safety decisions and actions, and standards of accountability being consistently applied (Safety Accountability)
  - Appreciation for those who report safety concerns/incidents
  - Information sharing and collaboration within AVS

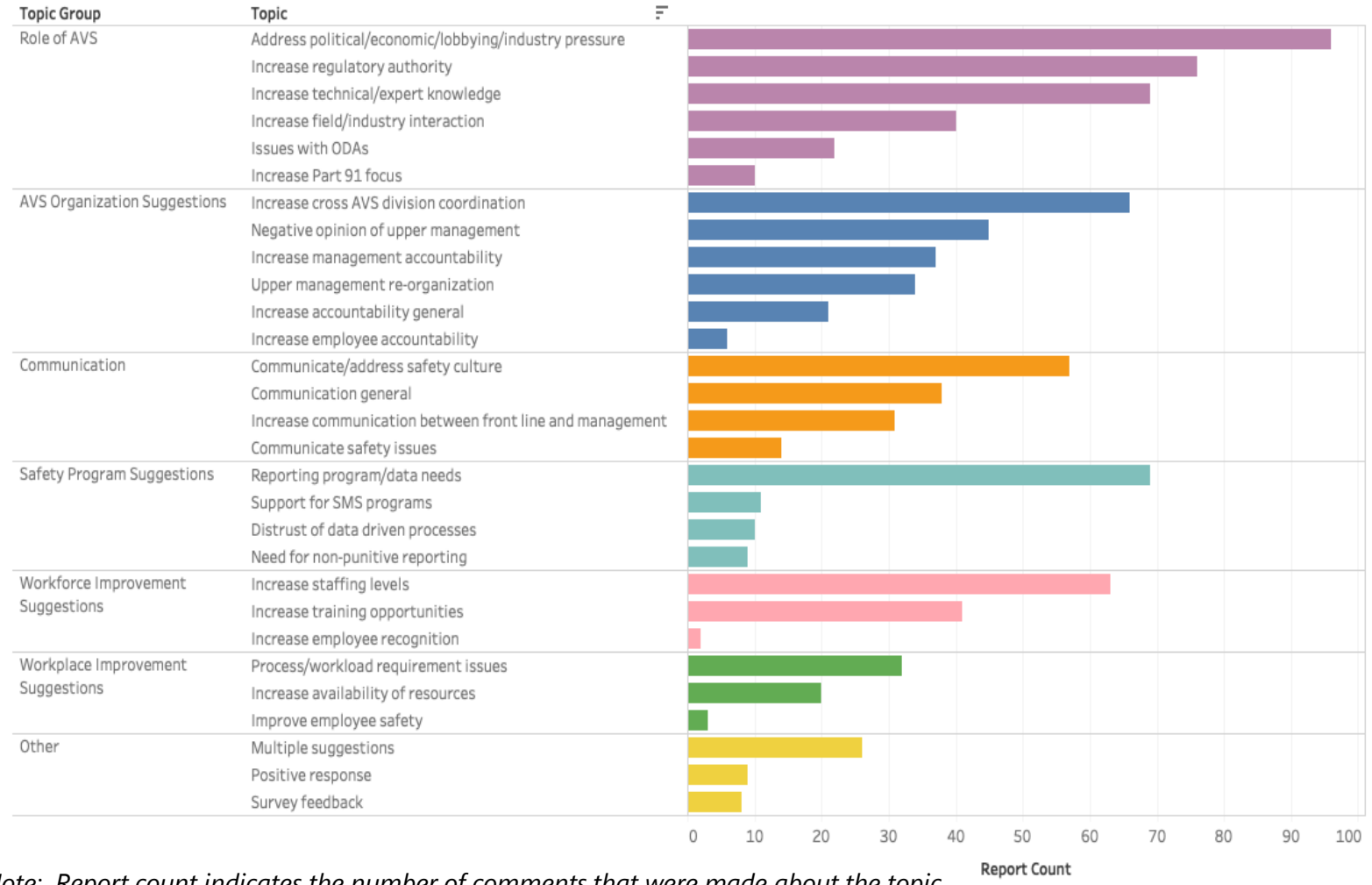
8. Responses to Open Ended Question: Key Themes

Analysis of Responses to Open-Ended Question

- **The AVS Safety Culture Survey included one open-ended question: *If you could do one thing to strengthen the AVS safety culture, what would it be?***
  - 1814 completed surveys
  - 966 responses to open-ended question
- **Responses were analyzed through a text-mining topic-modeling process and subject matter expert review.**
- **The analysis resulted in the identification of:**
  - 29 topics
  - 7 topic groups

Summary Counts of Topic Areas and Topic Groups

Q10.1-If you could do one thing to strengthen the AVS safety culture, what would it be?



Note: Report count indicates the number of comments that were made about the topic.

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Common Themes from Responses to the Open-Ended Question

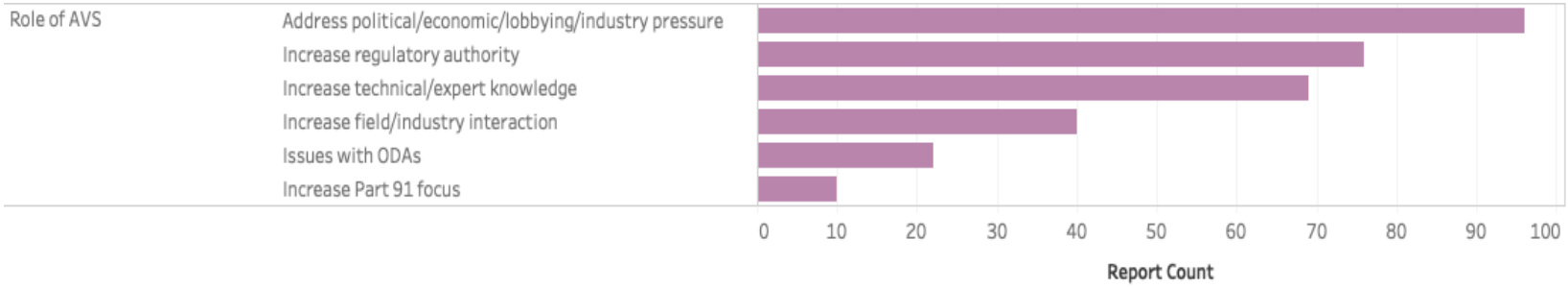
The following six common themes were identified based on the responses to the open-ended question:

1. AVS management should separate itself from the influences of industry, lobbyists, and other political pressures.
2. Upper level management should be held accountable for ensuring safety over all other potential pressures and increase awareness of front-line employee needs to maintain safety.
3. There is a need for a system-wide data sharing program to enable access to shared data, support the reporting and management of safety issues, and establish processes to address silos of information, gaps in knowledge, and issues related to restricted access.
4. There is a need to increase the number of inspectors in the field and their regulatory authority including addressing issues related to the delegation of regulatory oversight.
5. Inspectors need to increase the amount of time spent in the field, ensure technical expertise is maintained, and minimize administrative burdens.
6. There is a need for better communication, coordination of safety programs, and sharing of data across all of AVS.

Summary of Responses: Opinions on the Role of AVS

- **AVS should separate itself from the influences of industry, lobbyists, and other political pressures.**
  - Common references included opinions regarding FAA's tendency to put profit over safety, influence or 'too close a relationship' with industry, and the handling of the grounding of the 737 MAX.

- **There is a need to increase inspector's regulatory authority, technical expertise, and time spent in the field.**
  - Suggestions included reducing the amount of industry regulatory delegation, and empowering inspectors with better training and more resources for conducting surveillance in the field.



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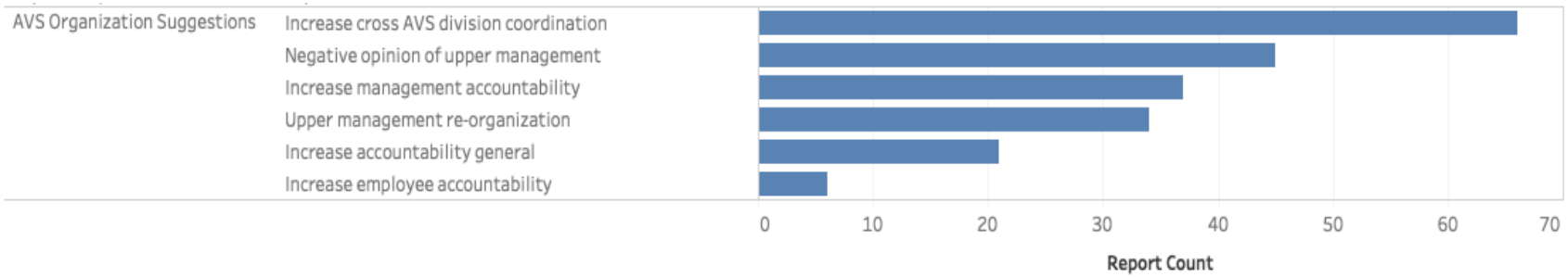
Summary of Responses: AVS Organization Suggestions

- **AVS should increase coordination across divisions.**
  - References included the need for awareness of division objectives, and sharing information on common safety issues, capabilities, and best practices.

- **Negative opinions on the effectiveness and safety-perspective of AVS upper-level management.**
  - References included upper management reorganization, lack of awareness by management of front-line workforce needs, and undue influence by industry.

- **There is a need to increase the accountability of upper level management for safety issues.**



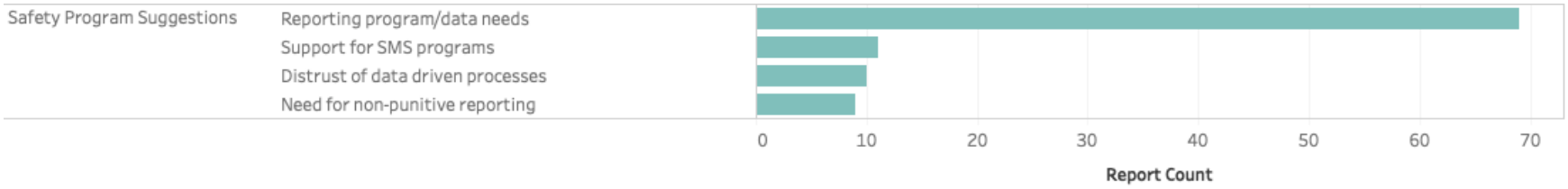
Summary of Responses: Communication

- **AVS should define, develop, train, and promote an integrated safety culture.**
  - References included the need to develop programs to support a safety culture – customized at the division level and across AVS, establish processes to communicate safety programs and promote best practices, and ensure employees are aware and convinced of AVS management commitment to safety.

- **There is a need for increased communication and coordination between front-line employees and management.**
  - Suggestions included management providing frequent, detailed information to employees, more face-to-face interaction, and ensuring front-line employees are aware of the impact of their work.

Summary of Responses: Safety Program Suggestions

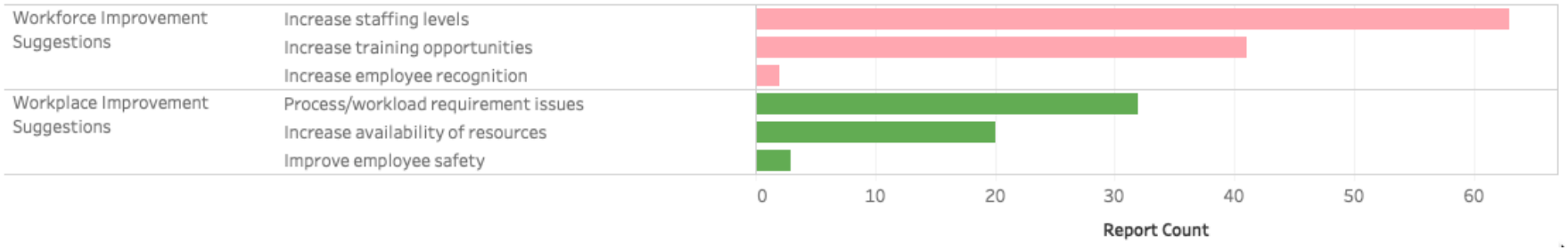
- **There is a need for an established, system-wide reporting program and shared data.**
  - References included the need for a single or system-wide reporting program, addressing silos of data and restricted access, and data collection and analytics support.
- **Distrust of processes and decisions made or justified as data-driven.**
  - References included opinions that safety data are too closely held, data may not always be reliable, and safety decisions do not appropriately balance data with historical knowledge/experience and subject matter expertise.
- **Requests for increased support for safety management system programs and need for non-punitive reporting.**
  - Opinions included need to ensure protection for employees who report safety issues, active use of reported data, and need to increase resources to ensure SMS programs are successful.



Summary of Responses: Workforce and Workplace Improvements

- **AVS needs to increase inspector staffing levels, employee training opportunities, and recognition.**
  - References included the need for more inspectors and engineering staff with field level expertise, to maintain expertise of employees through training aligned with status of industry advancements, and to attract and retain skilled employees.

- **AVS needs to increase resources available to employees and address burdensome administrative tasks that impede productivity.**
  - References included the need to provide front-line employees and inspectors with critical technology and information, and removal/redesign of the SAS system.



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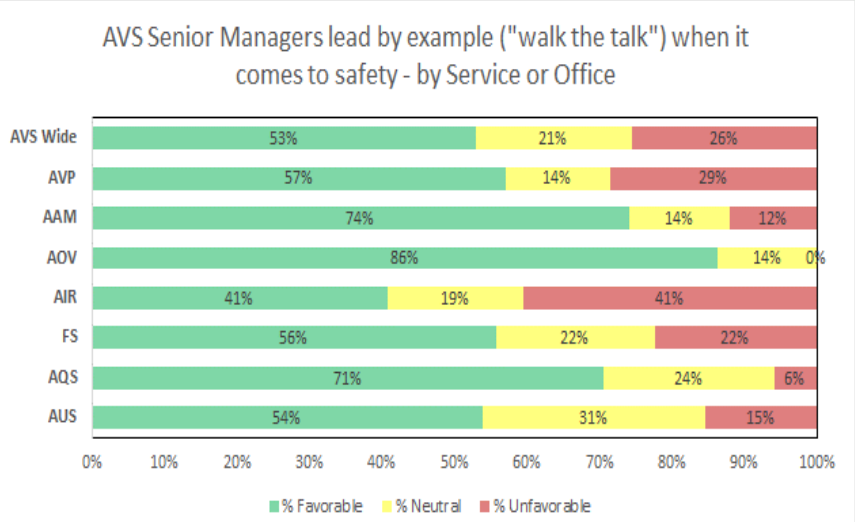
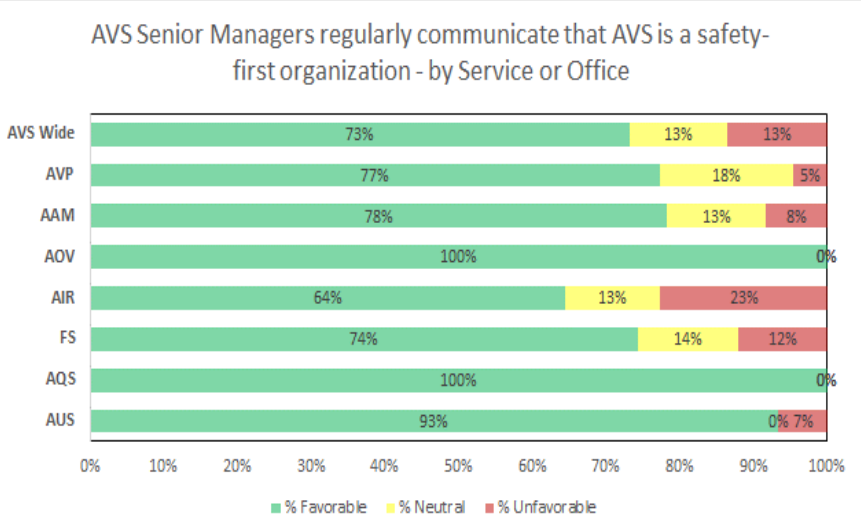
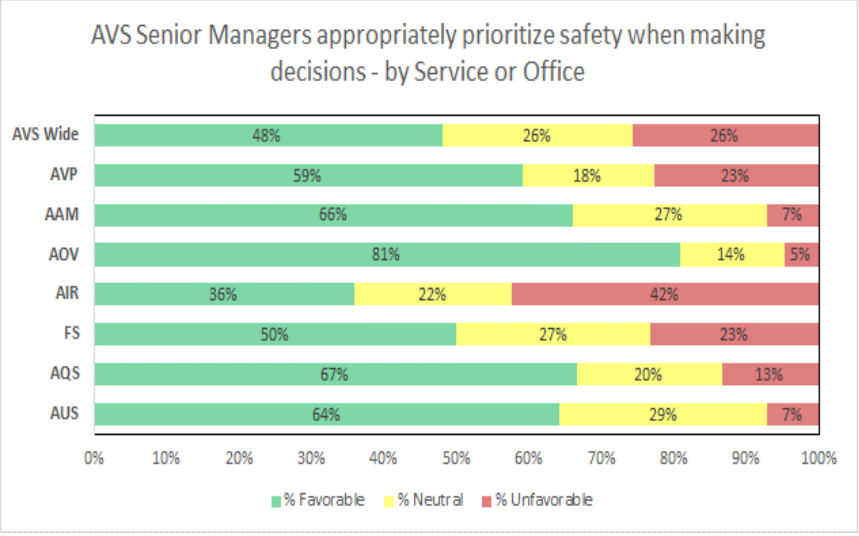
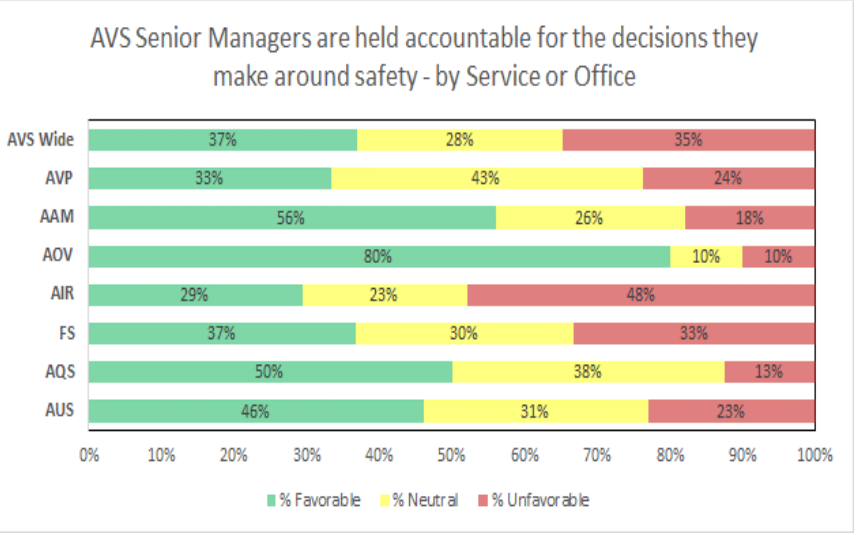
9. Appendix A: Charts for All Survey Questions by Service/Office

Leadership Commitment to Safety Questions









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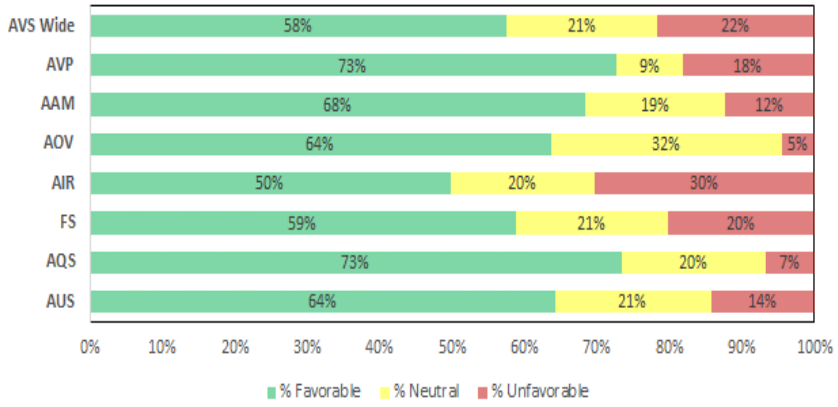
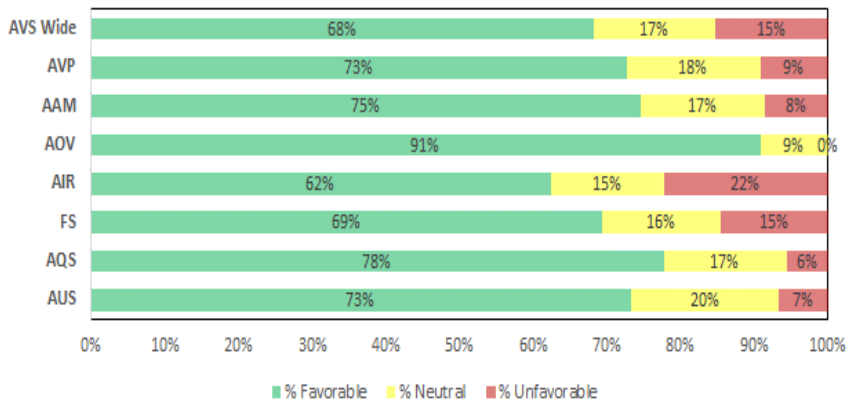
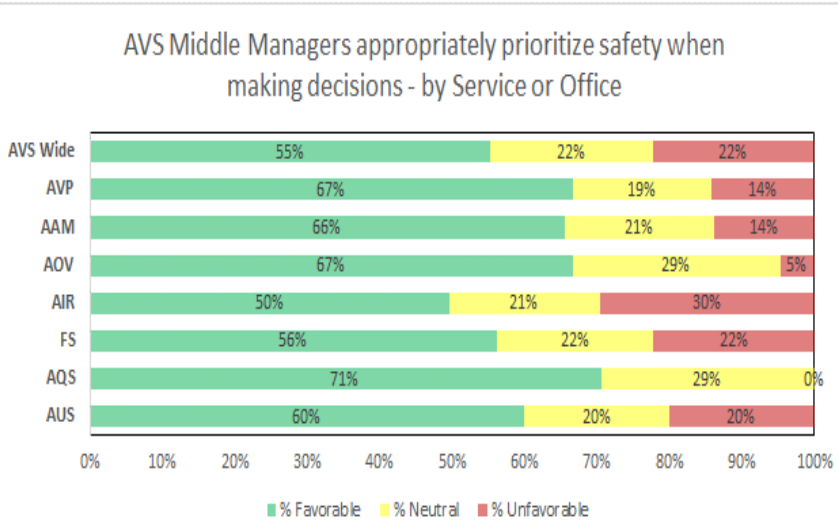
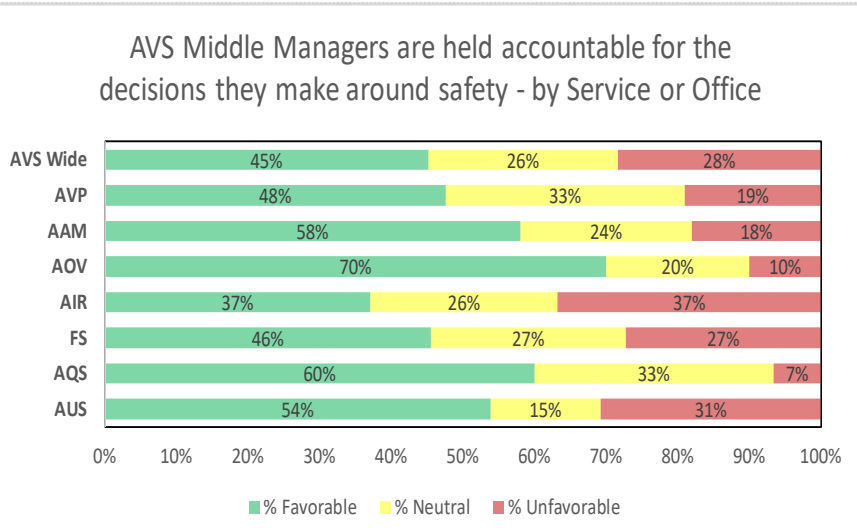
Leadership Commitment to Safety Questions









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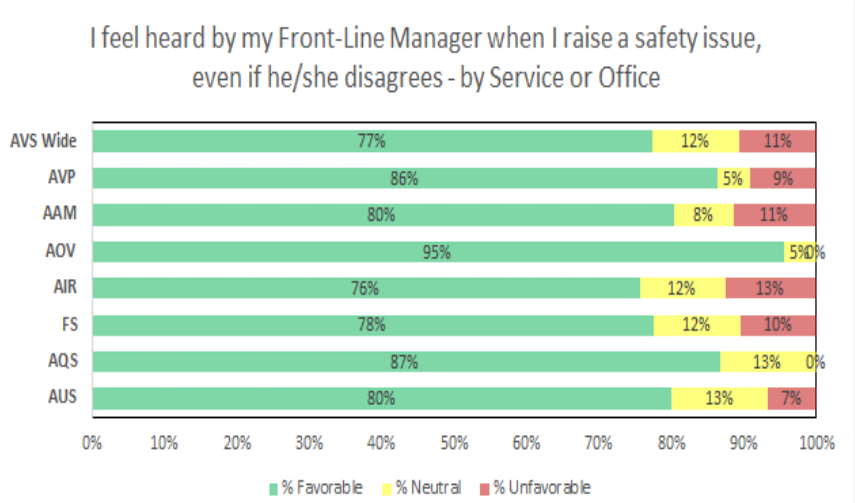
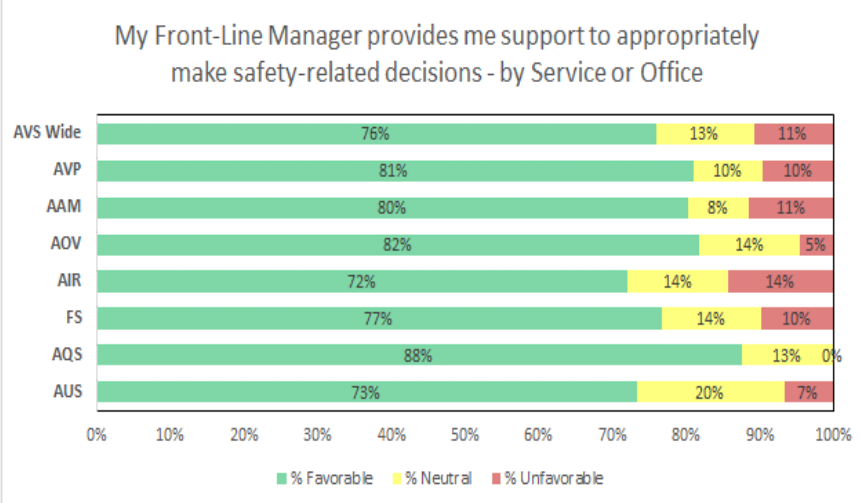
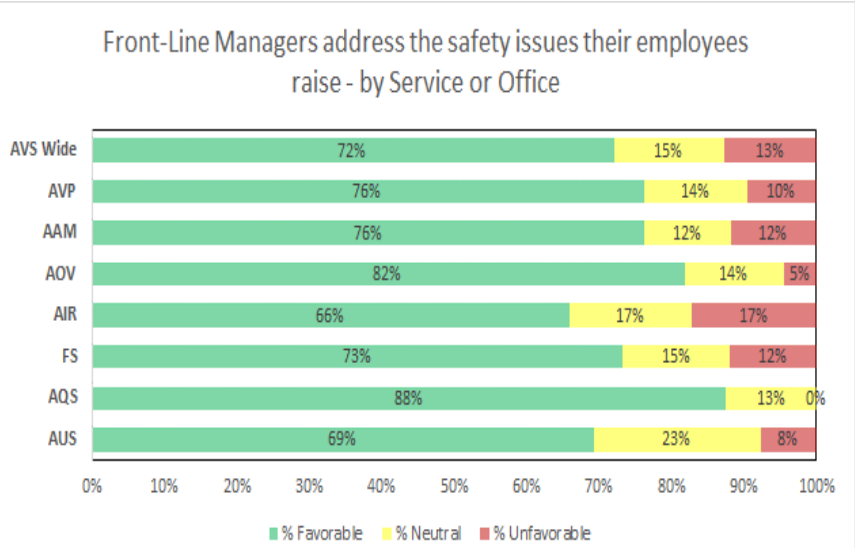
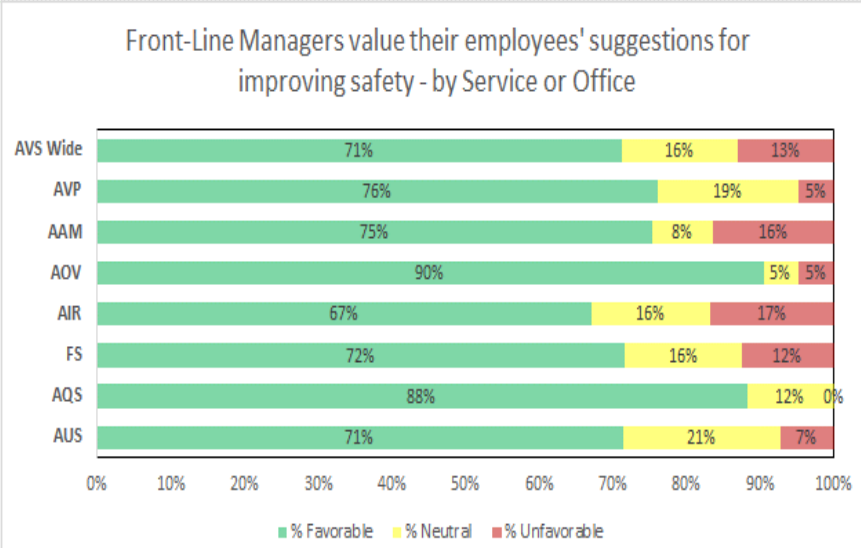
Front-Line Manager Support for Safety Questions









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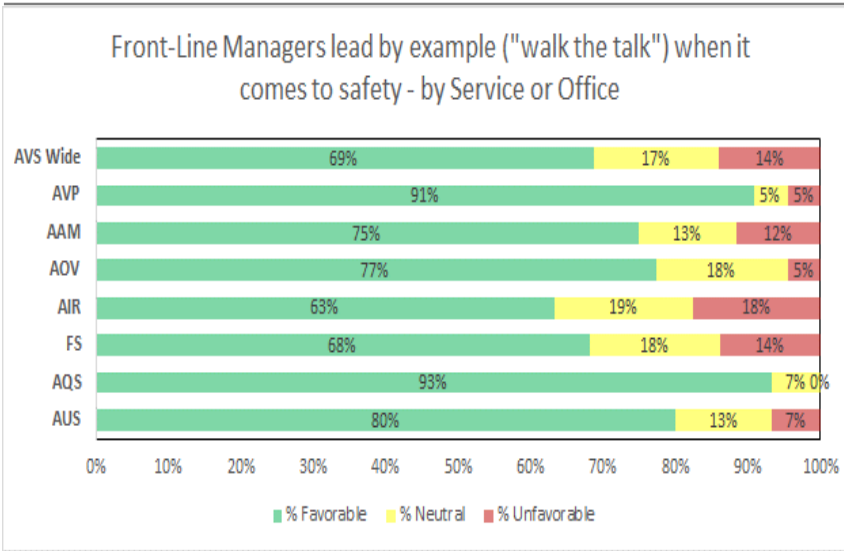
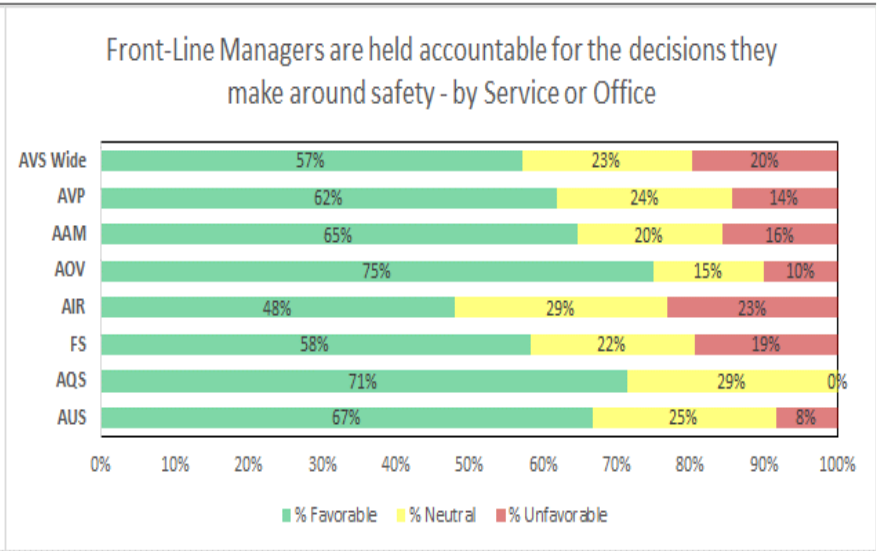
Front-Line Managers Support for Safety Questions





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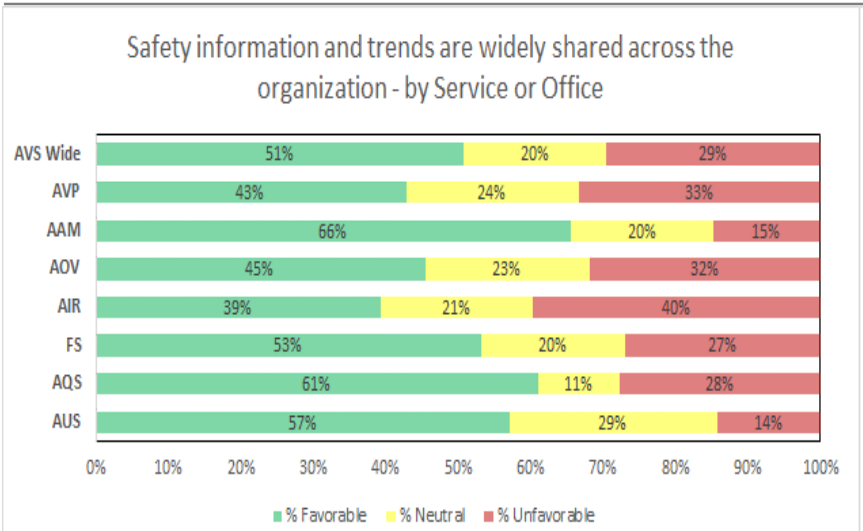
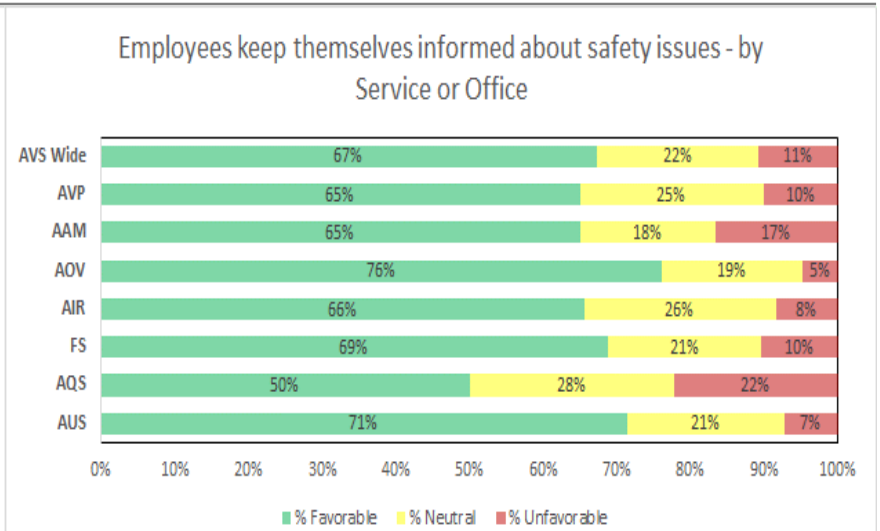
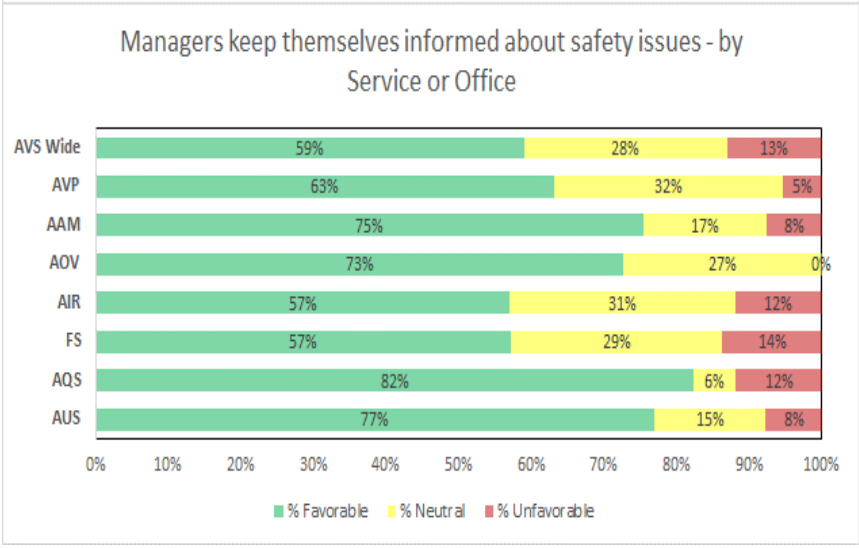
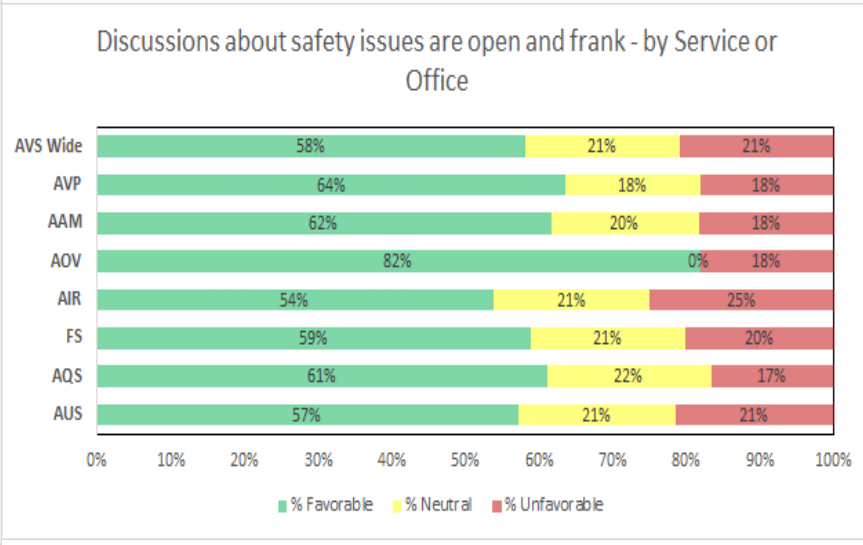
Open Communication Questions









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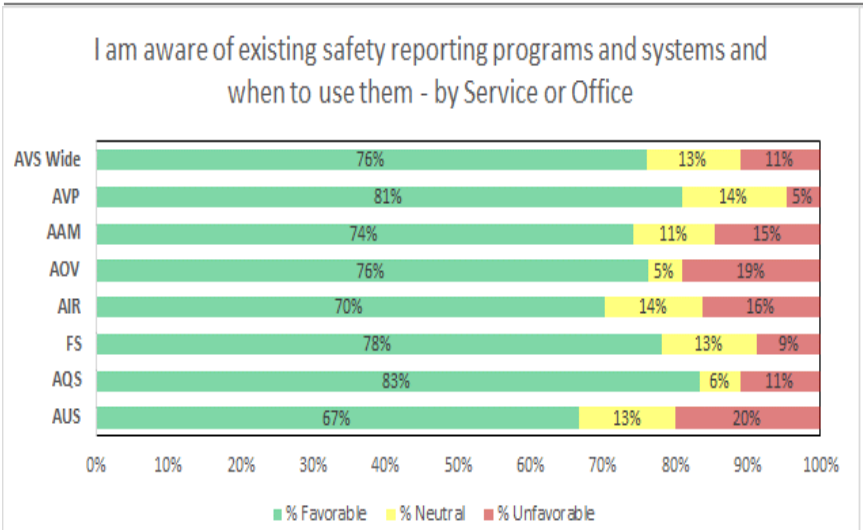
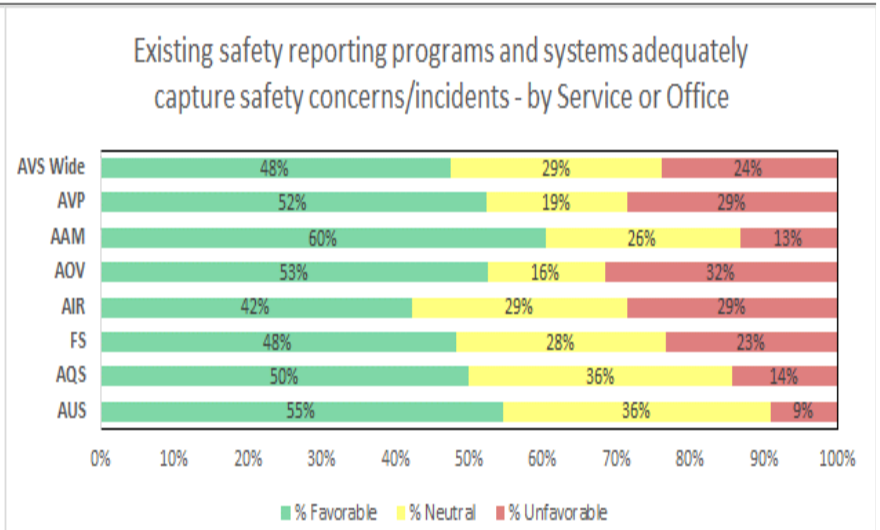
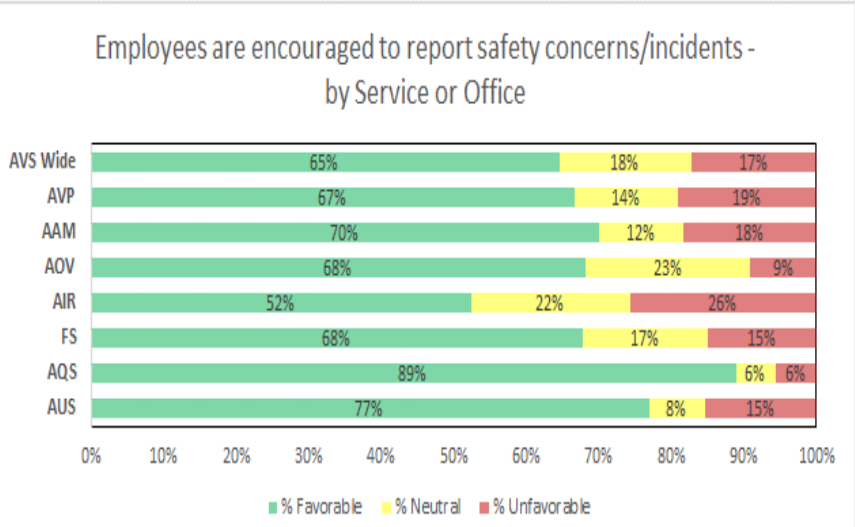
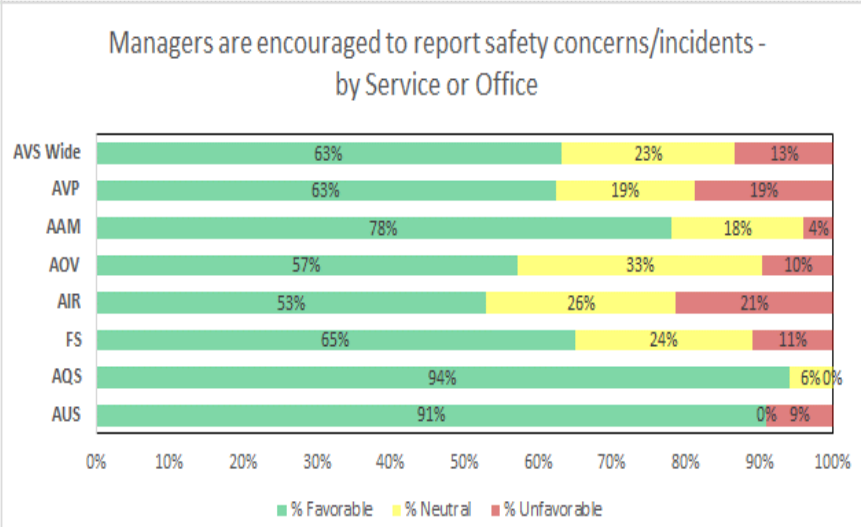
Reporting and Just Culture Questions









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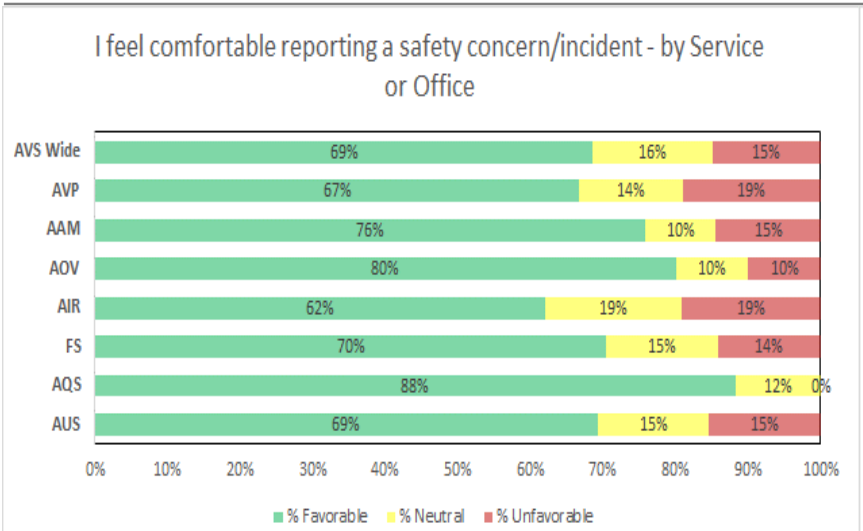
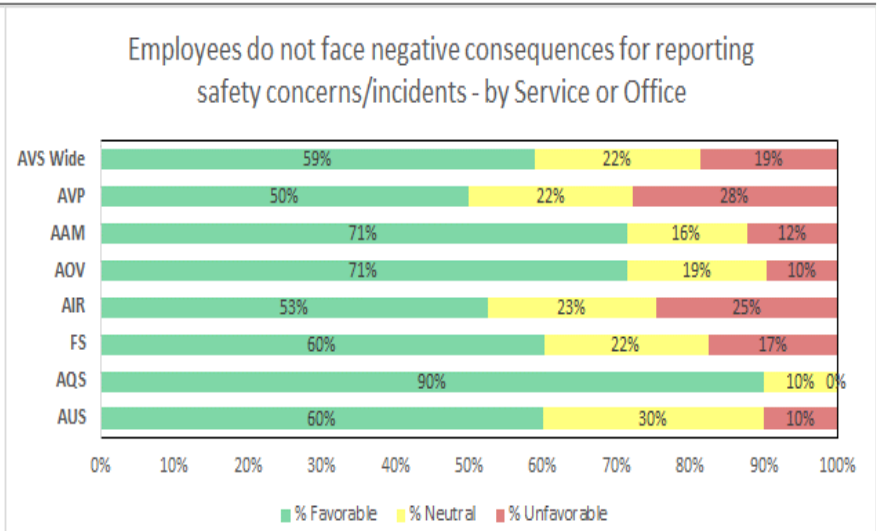
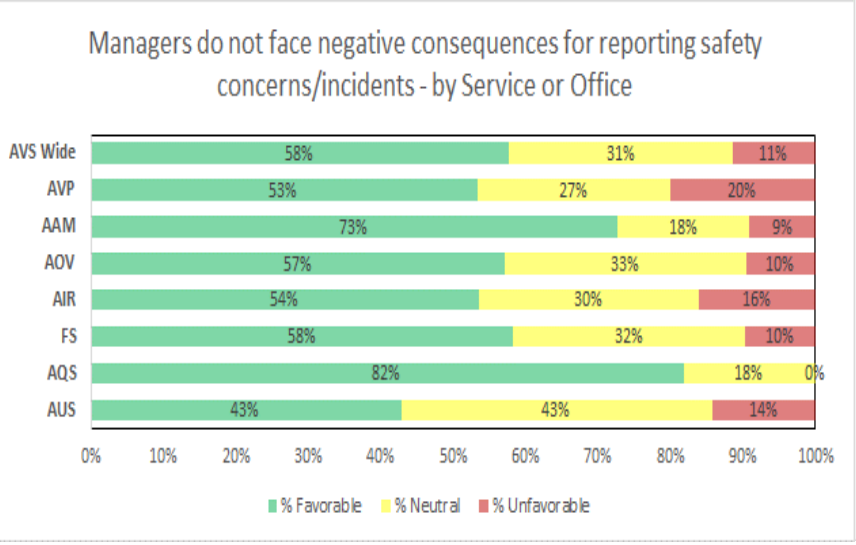
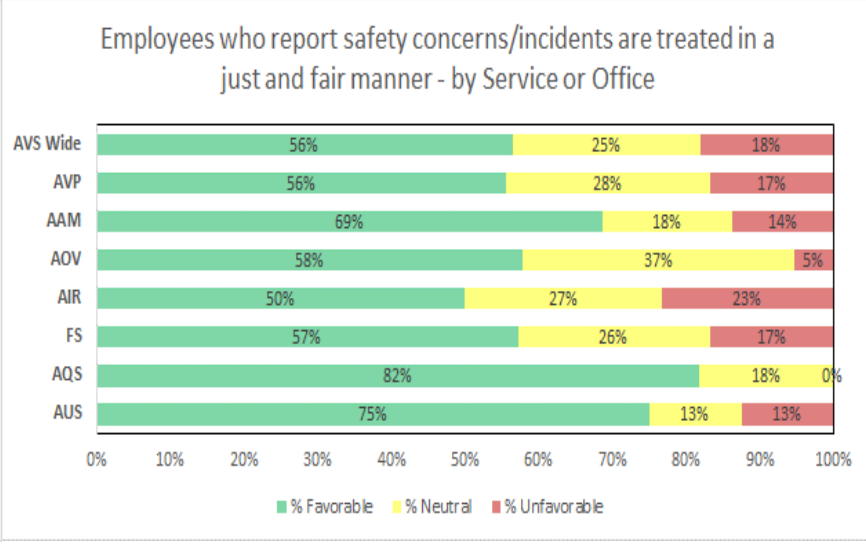
Reporting and Just Culture Questions









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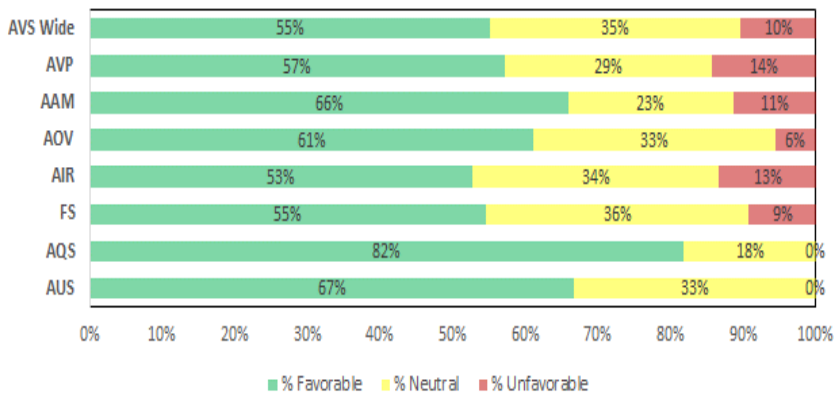
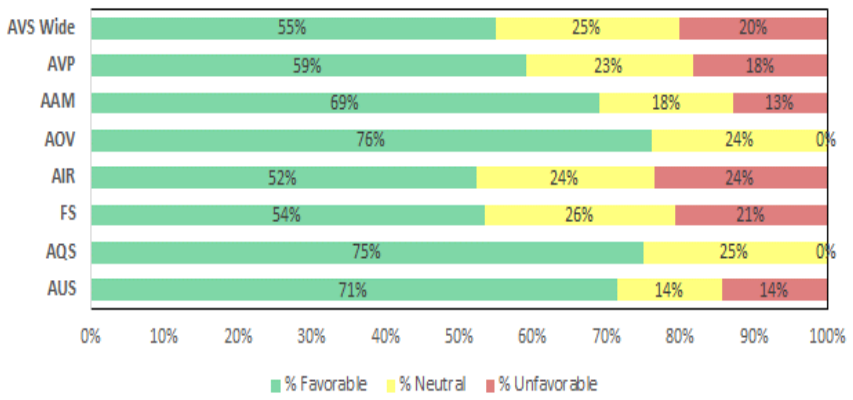
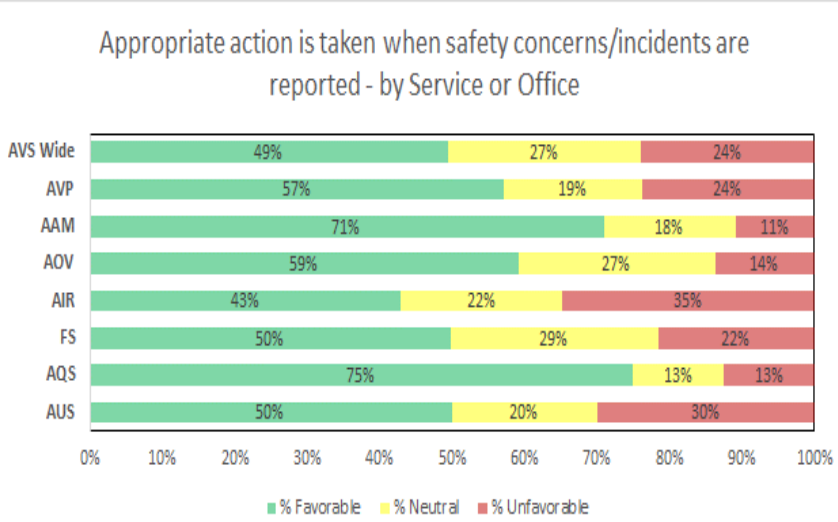
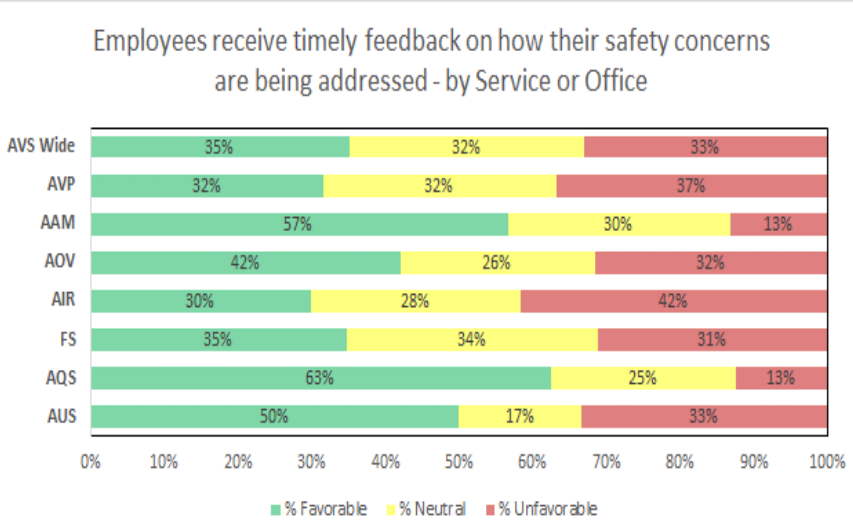
Reporting and Just Culture Questions









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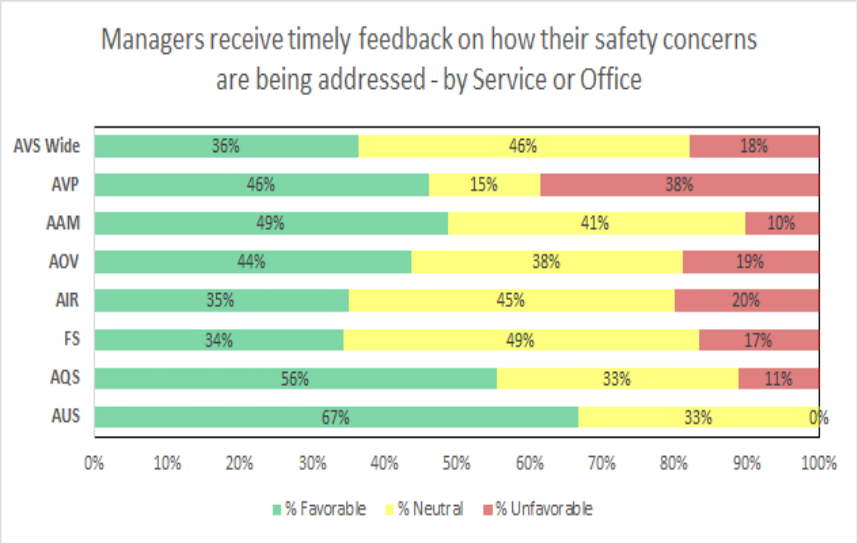
Reporting and Just Culture Questions



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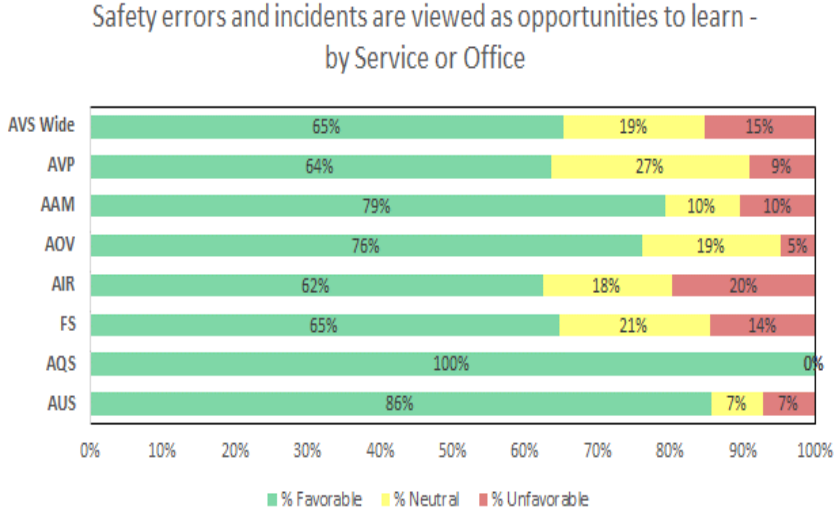
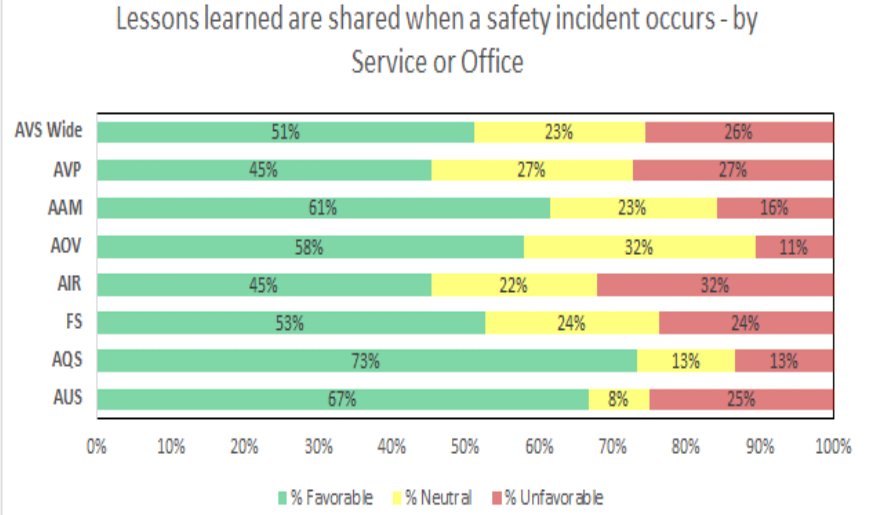
Continuous Learning Questions





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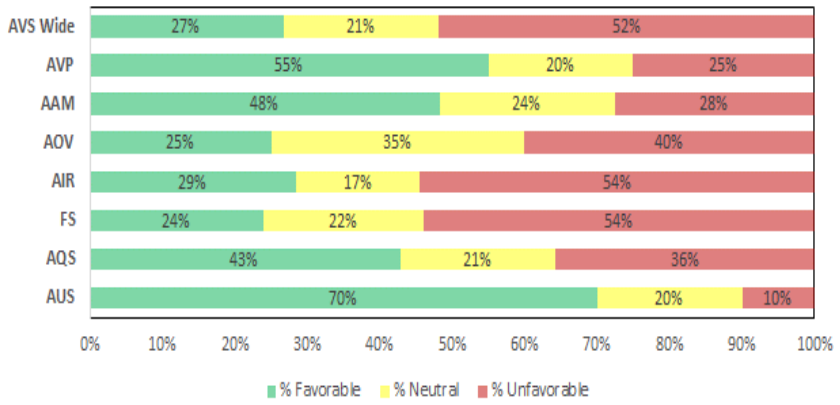
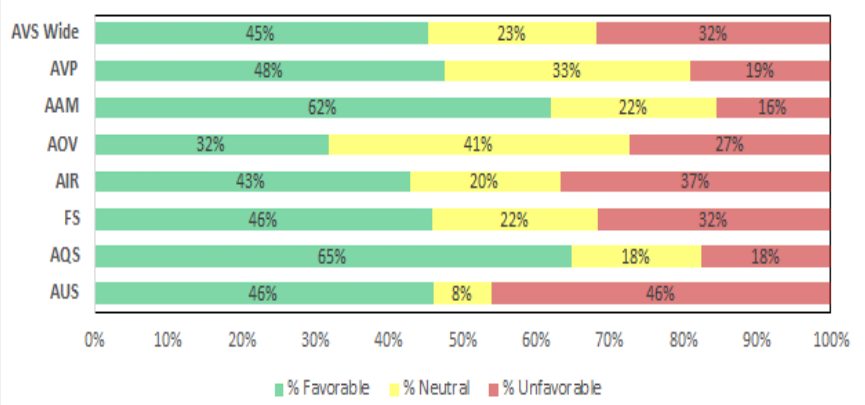
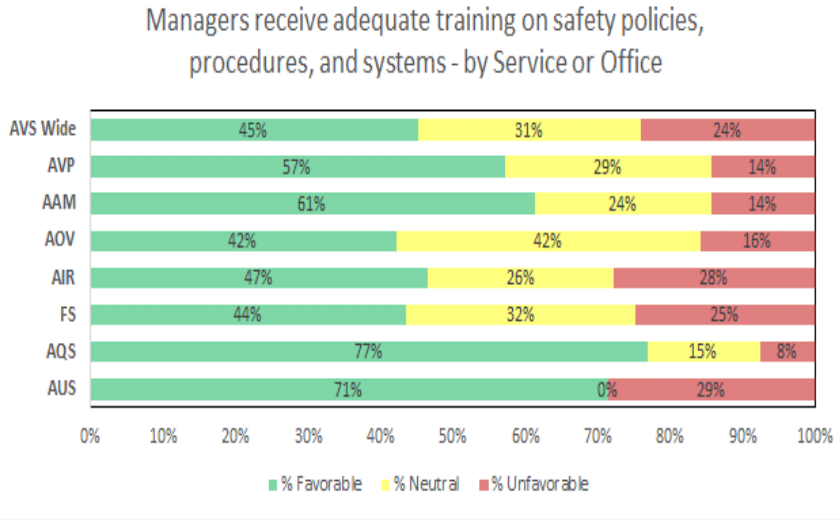
Training and Resources Questions







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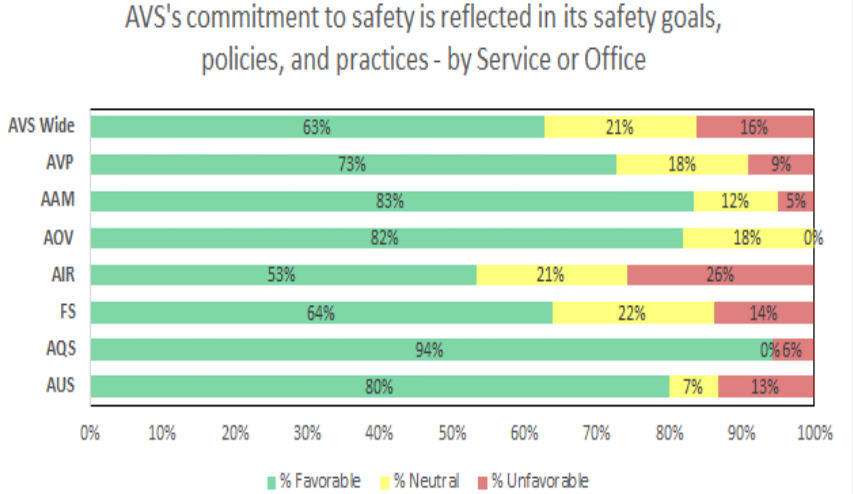
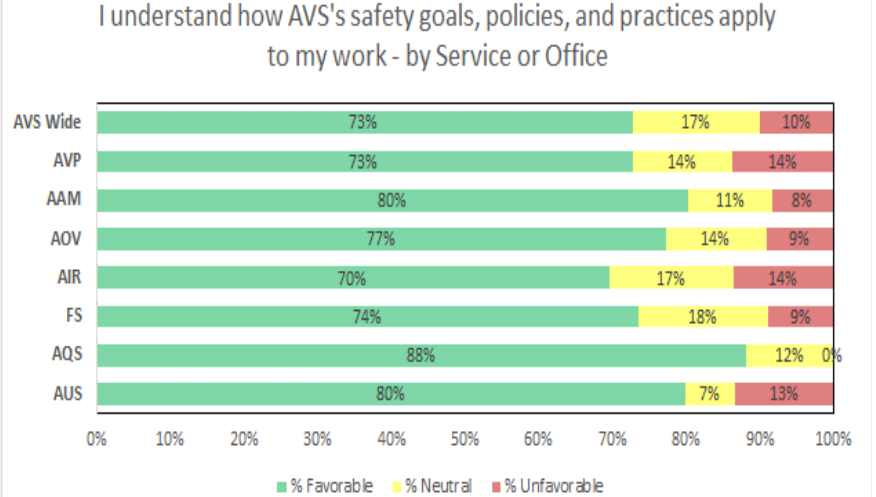
Safety Policies and Procedures Questions





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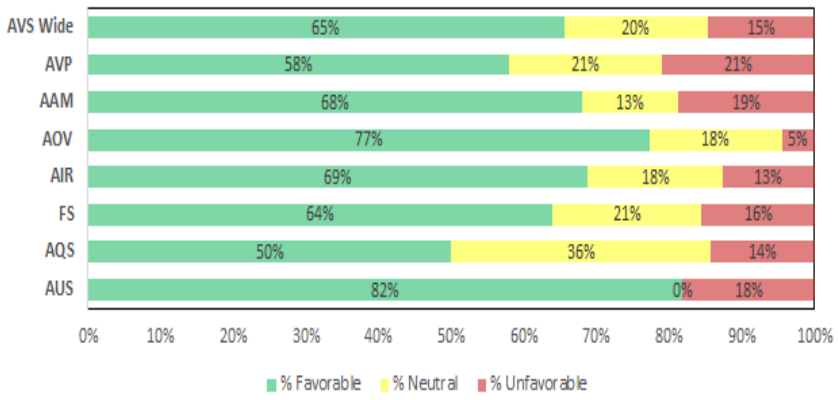
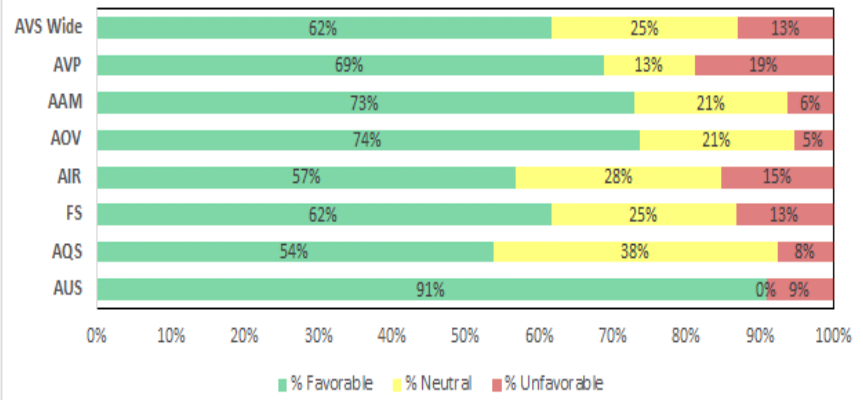
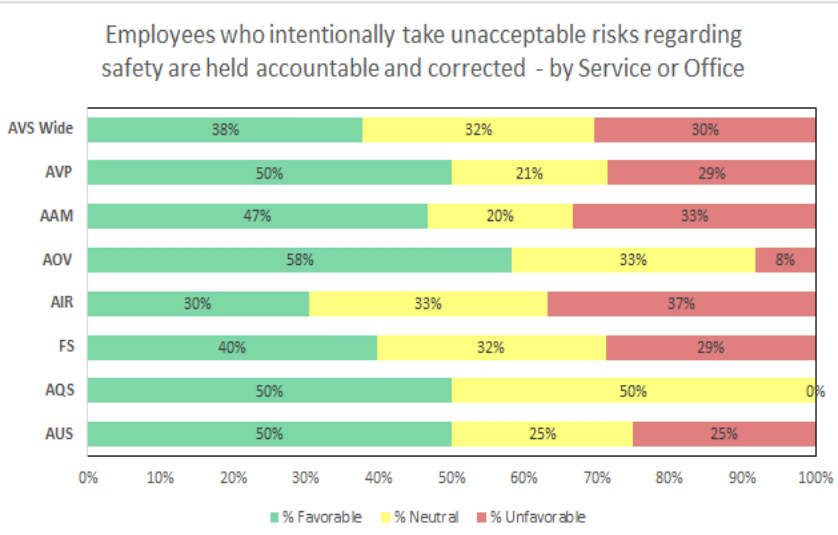
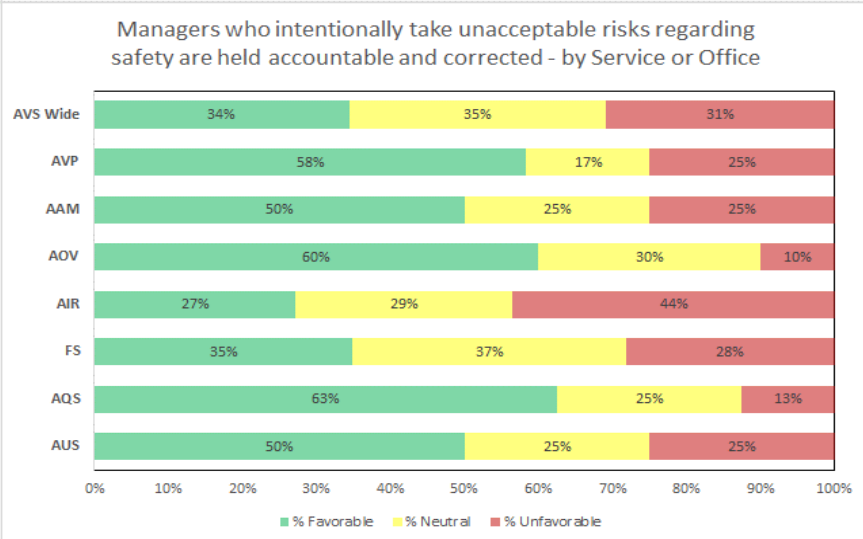
Safety Accountability Questions









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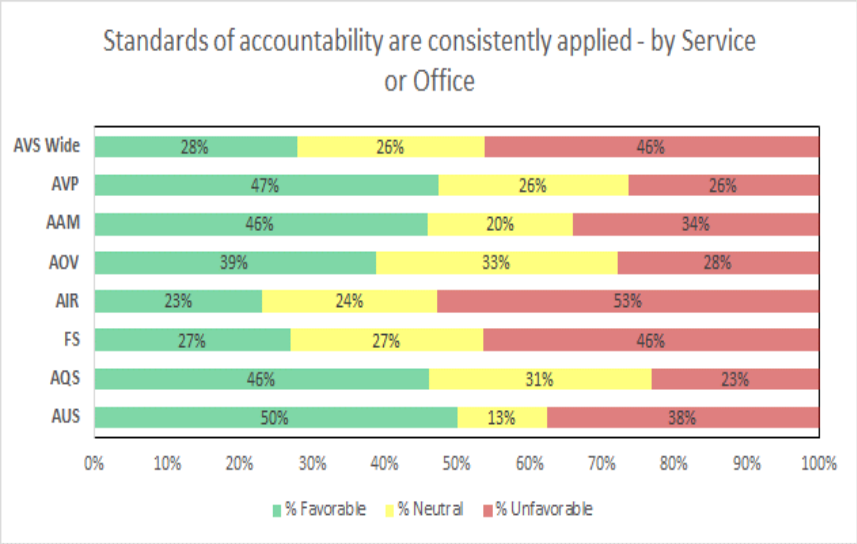
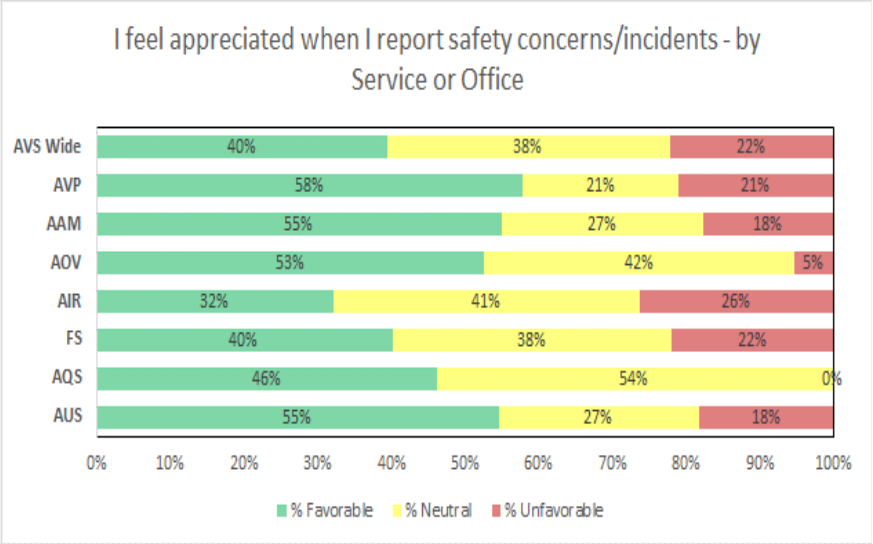
Safety Accountability Questions





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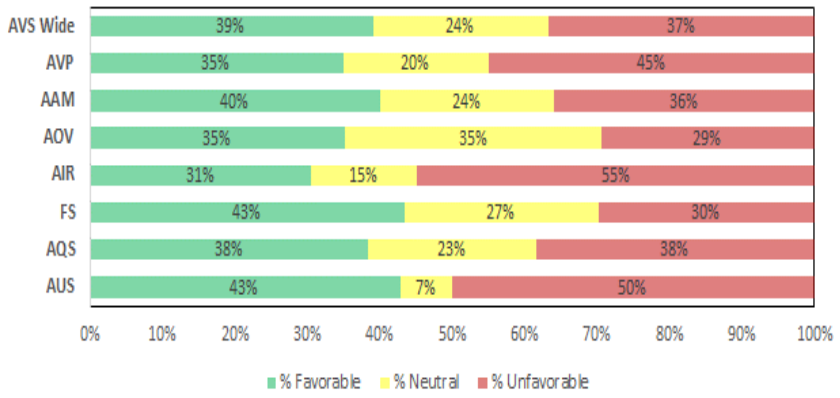
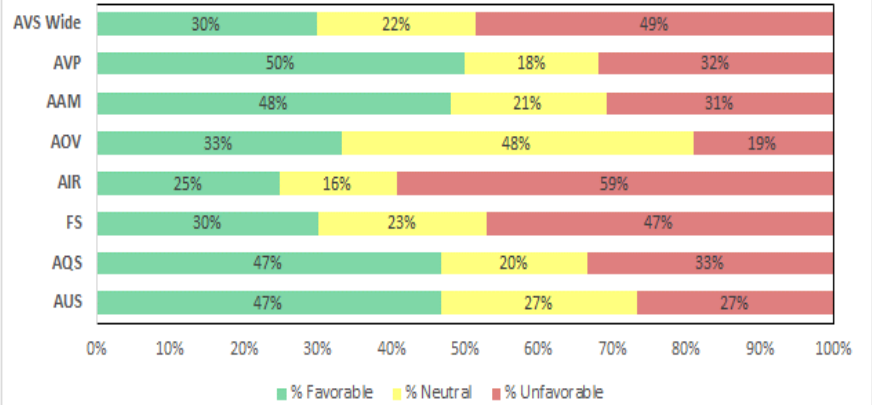
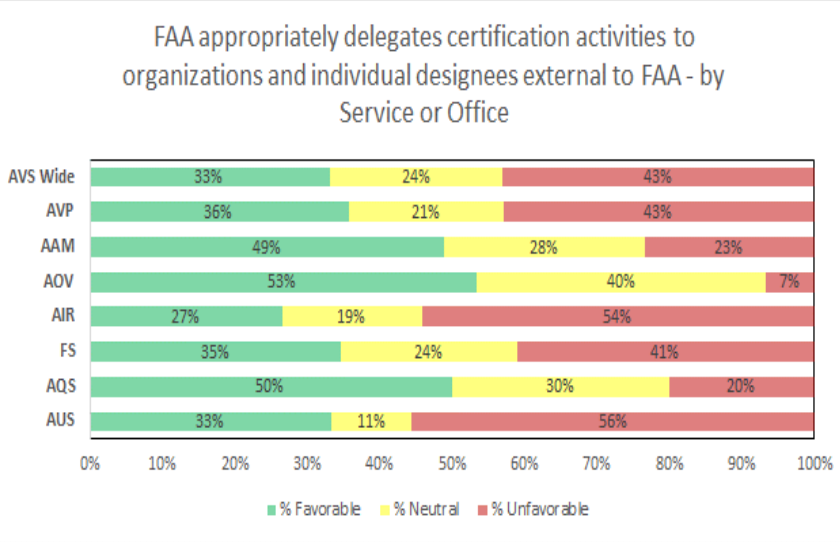
External Influence Questions







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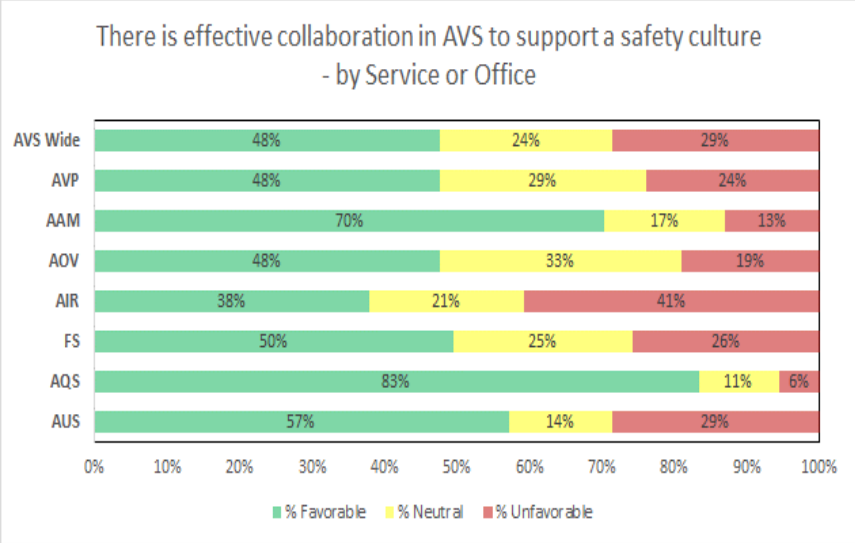
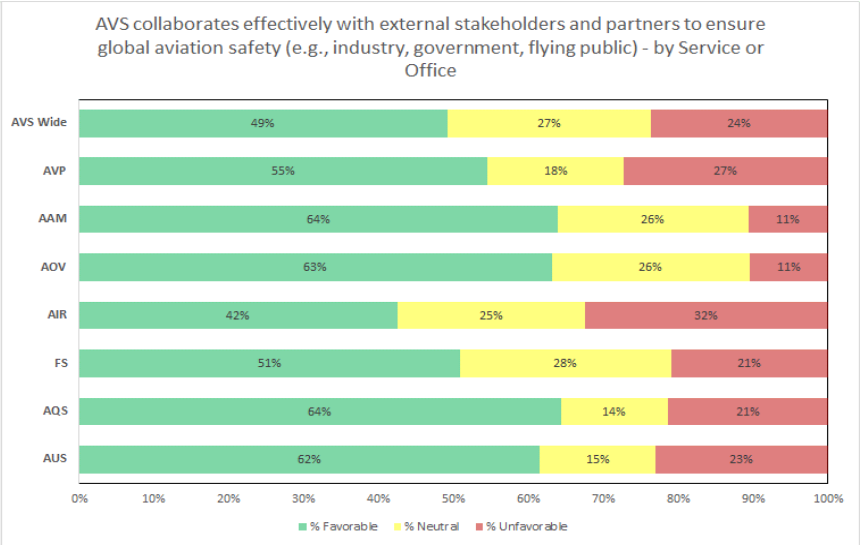
Collaboration Questions





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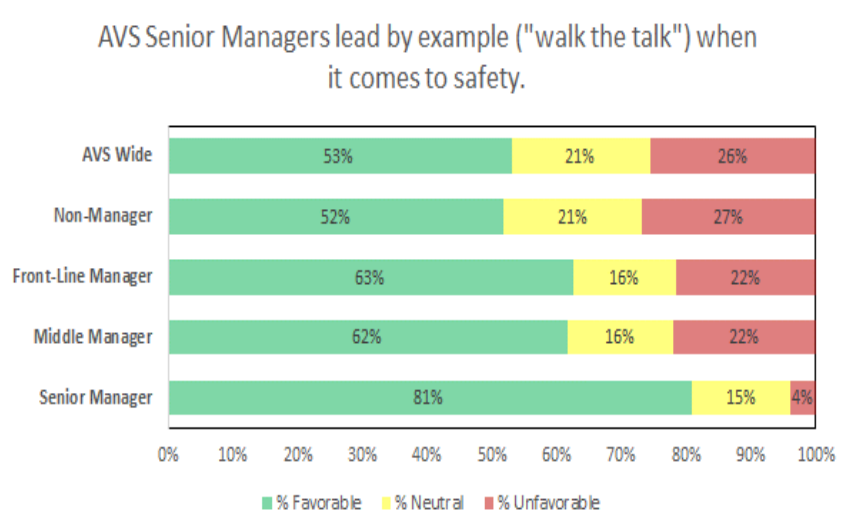
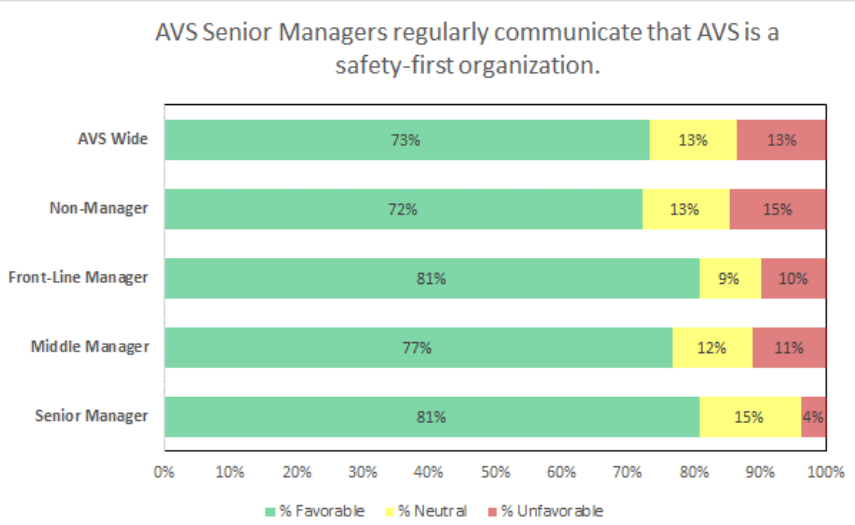
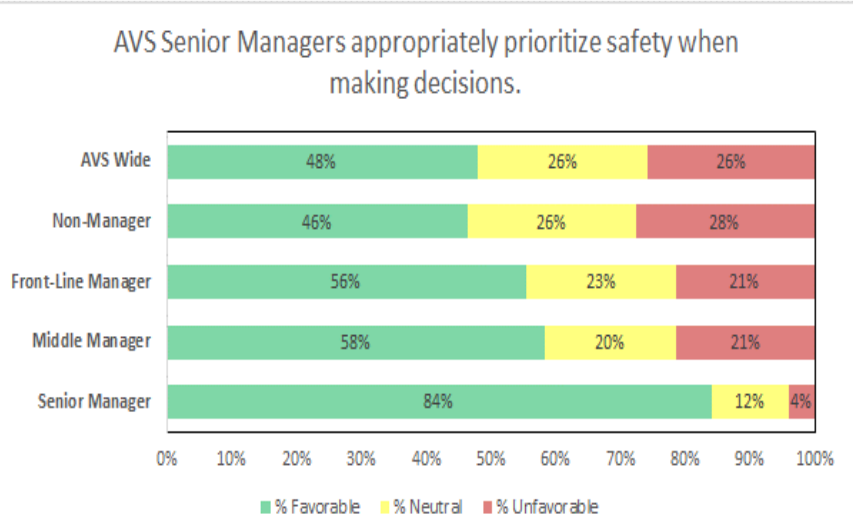
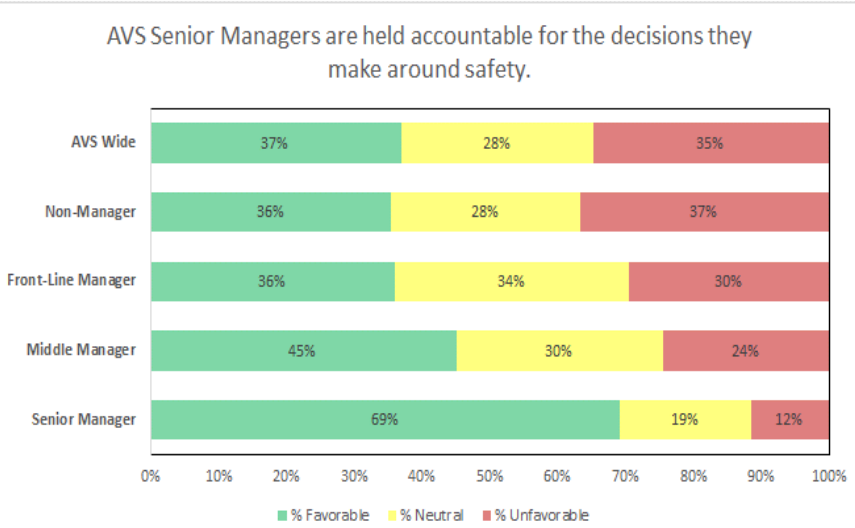
Appendix B: Charts for All Survey Questions by Level

Leadership Commitment to Safety Questions









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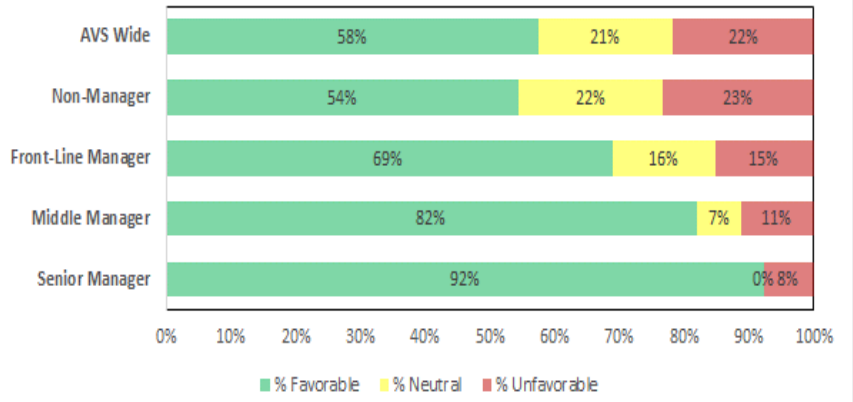
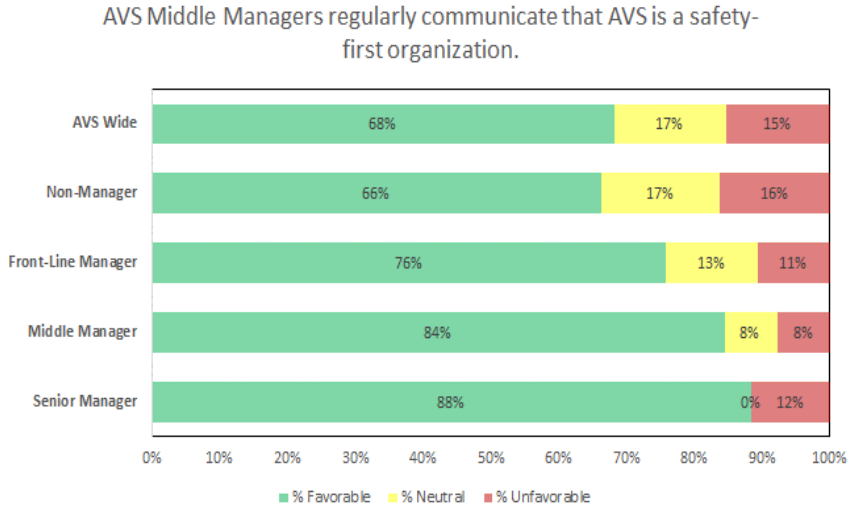
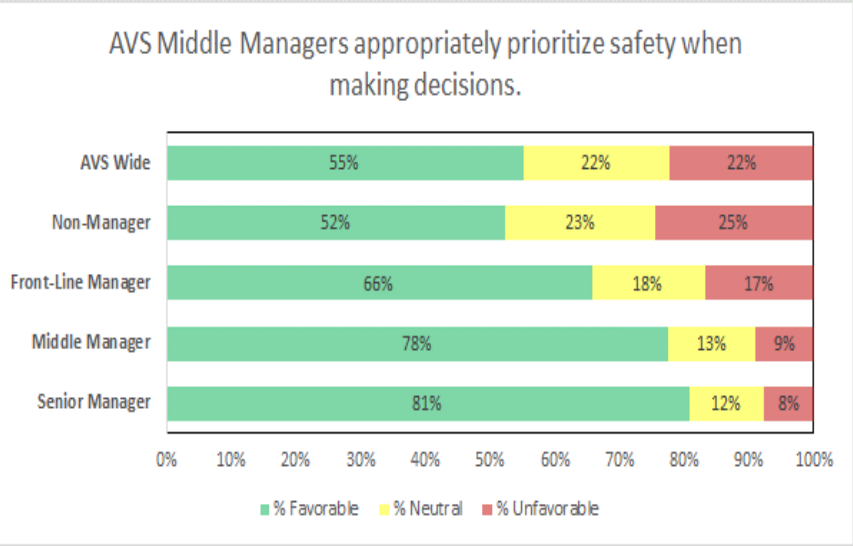
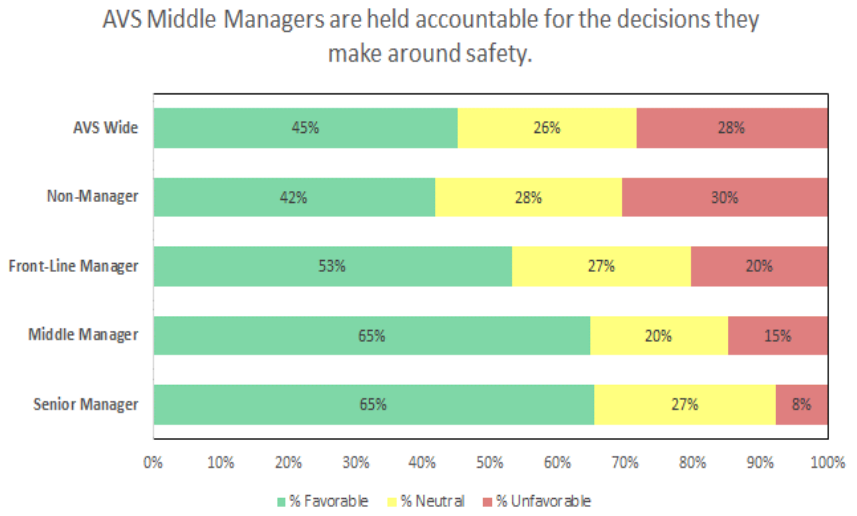
Leadership Commitment to Safety Questions









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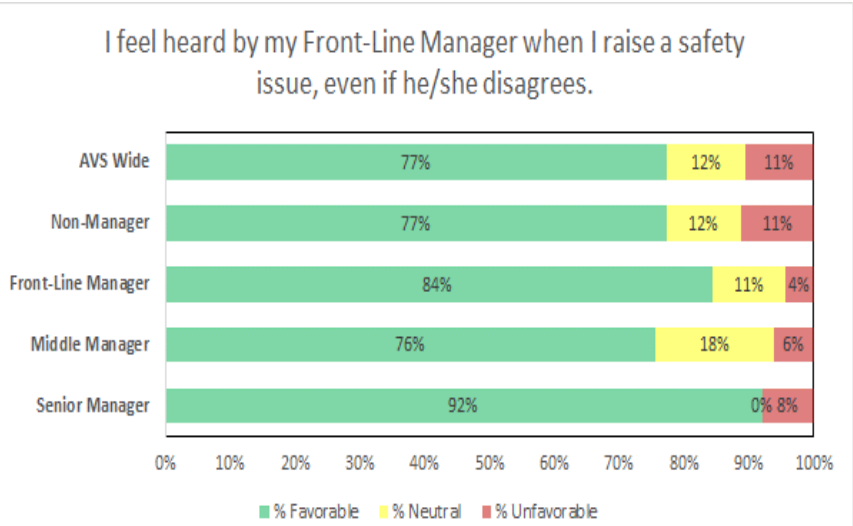
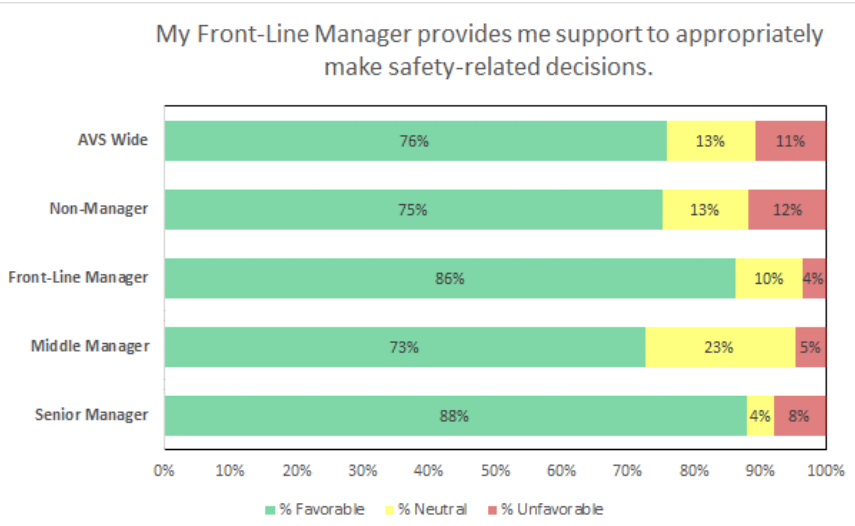
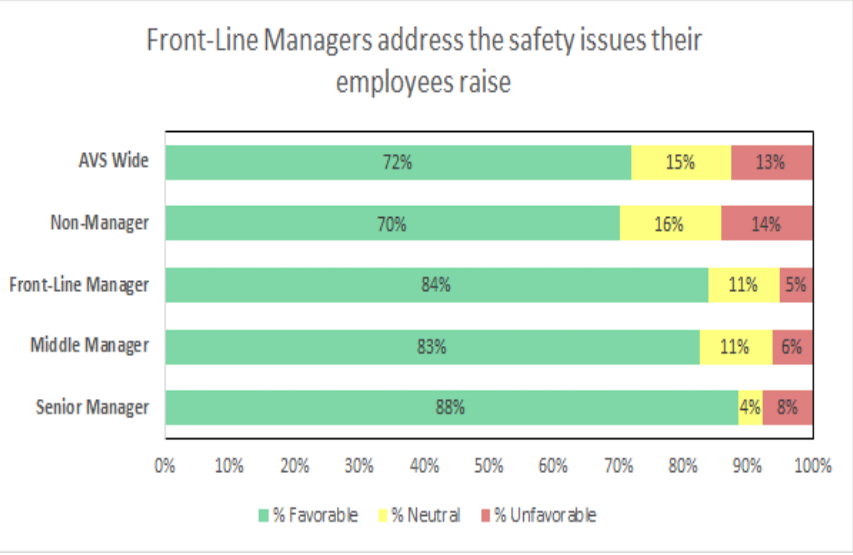
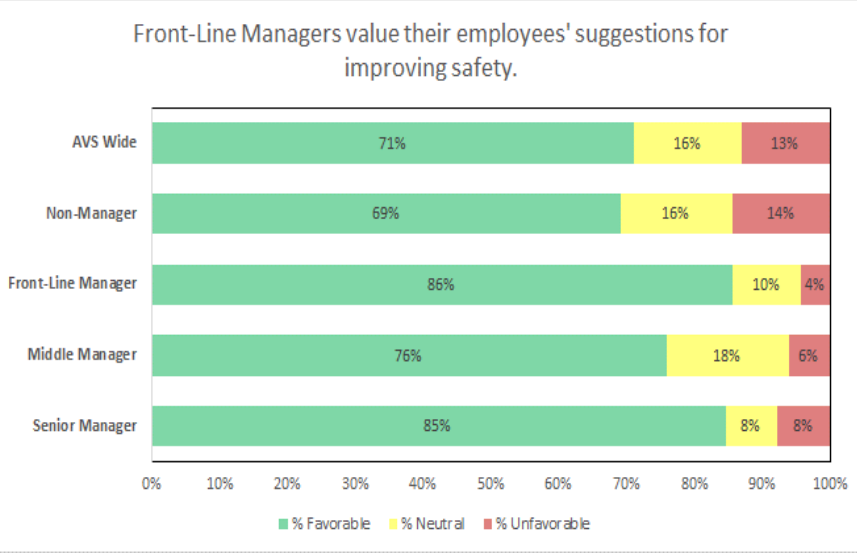
Front-Line Manager Support for Safety Questions









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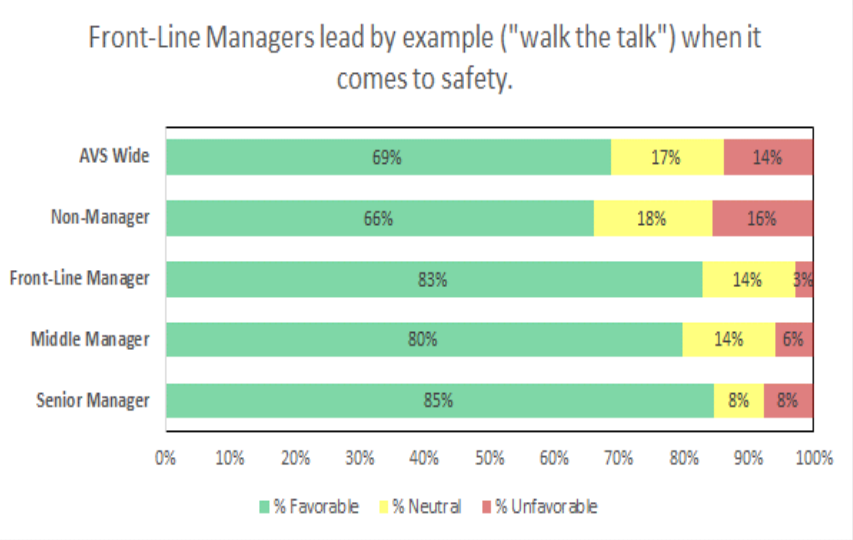
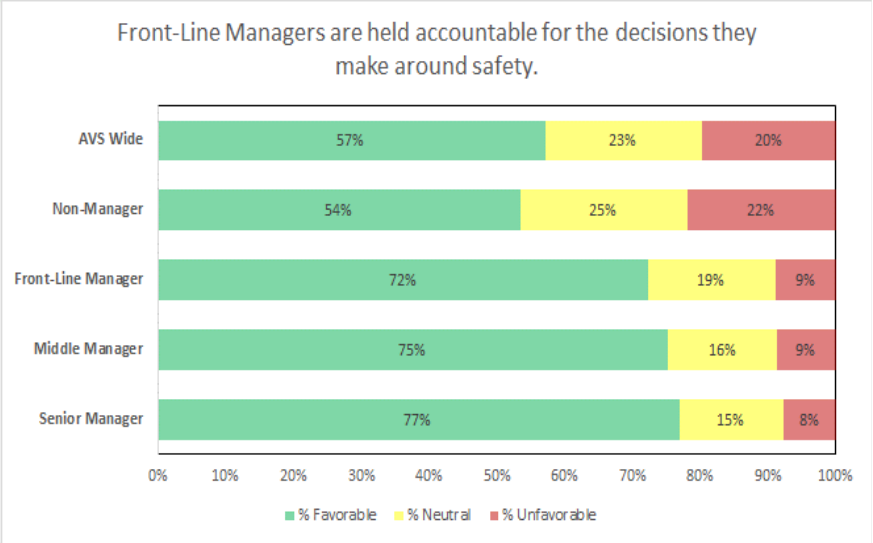
Front-Line Manager Support for Safety Questions





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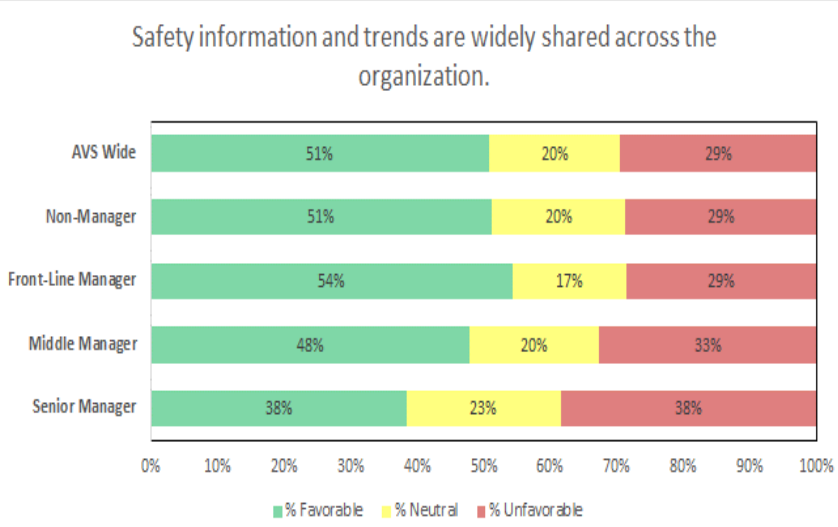
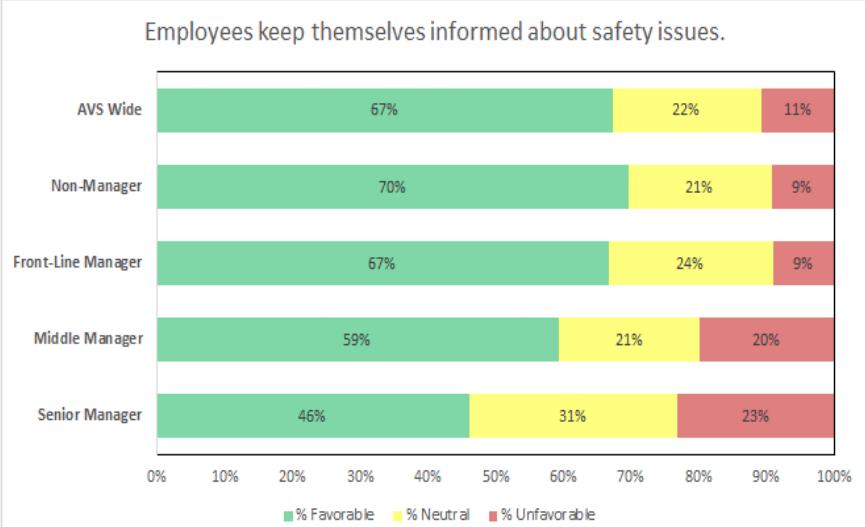
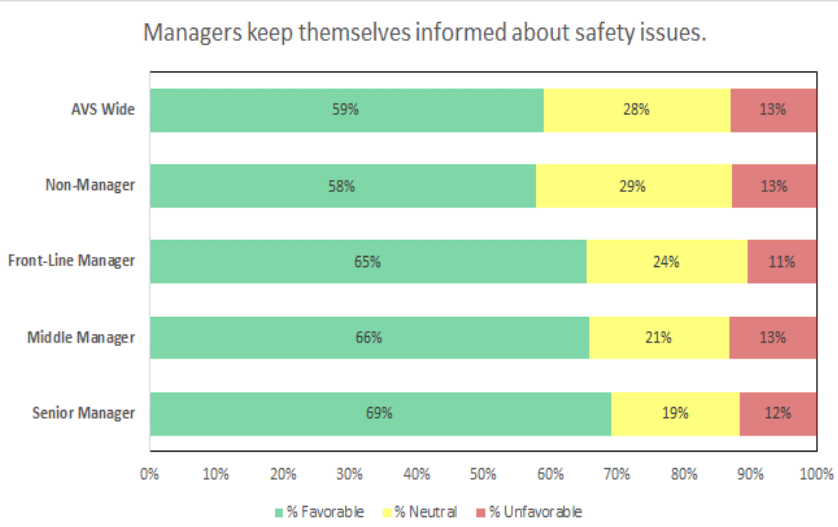
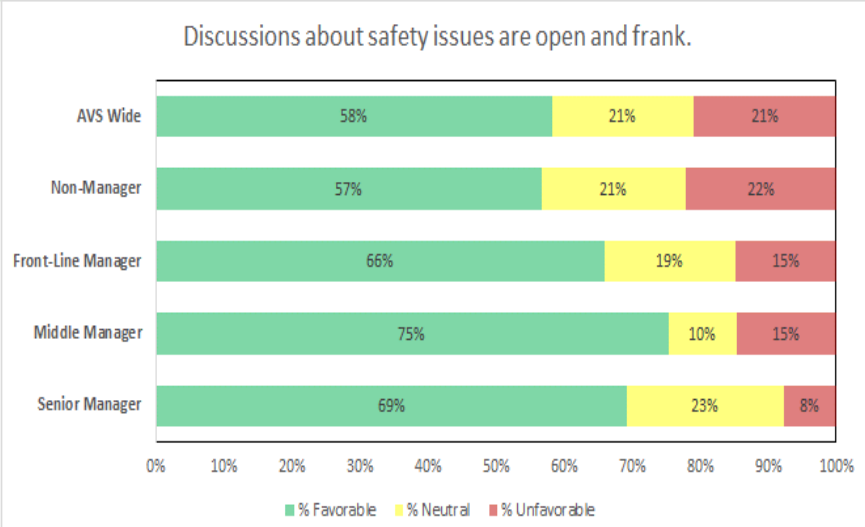
Open Communication Questions









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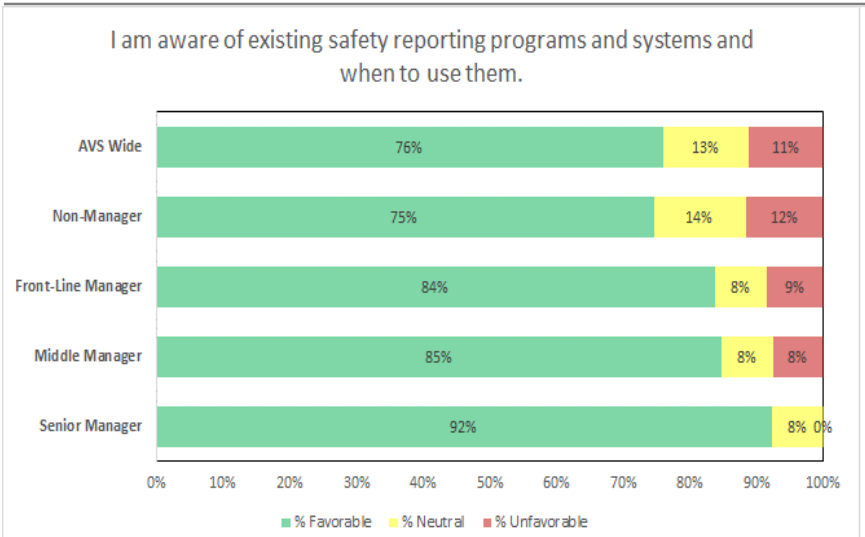
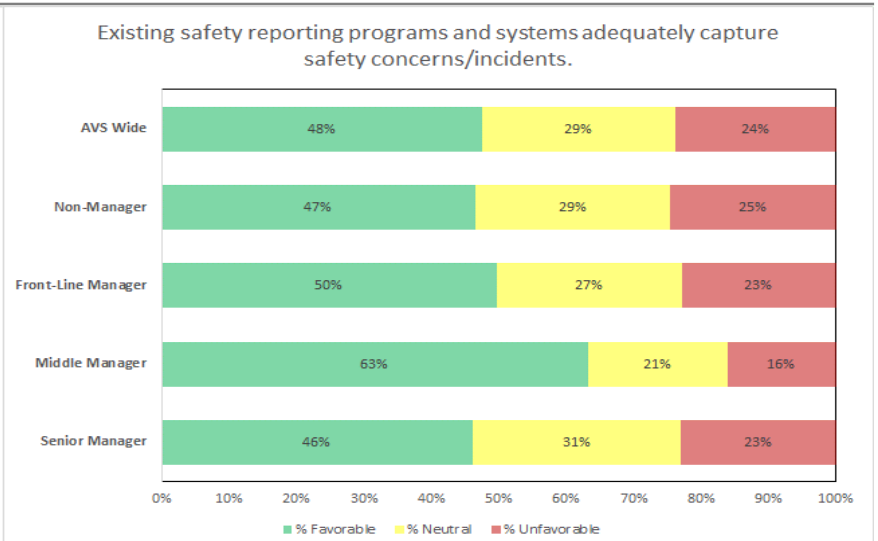
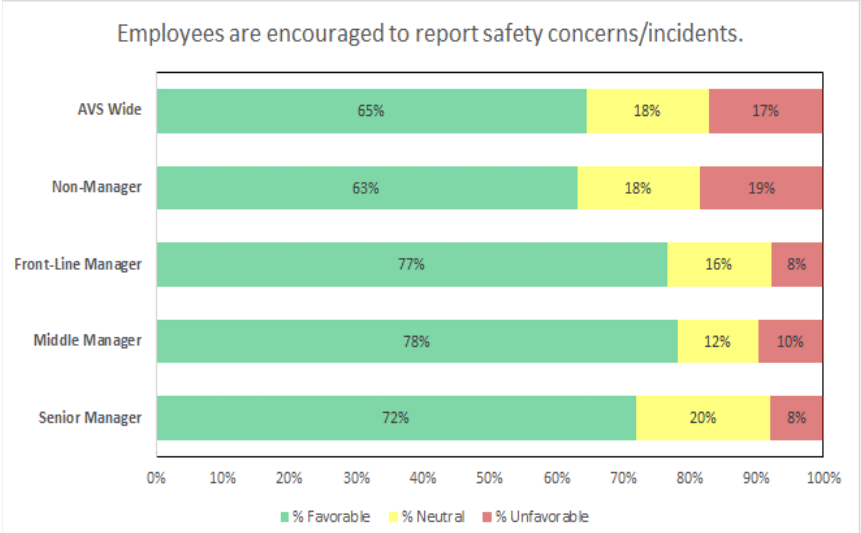
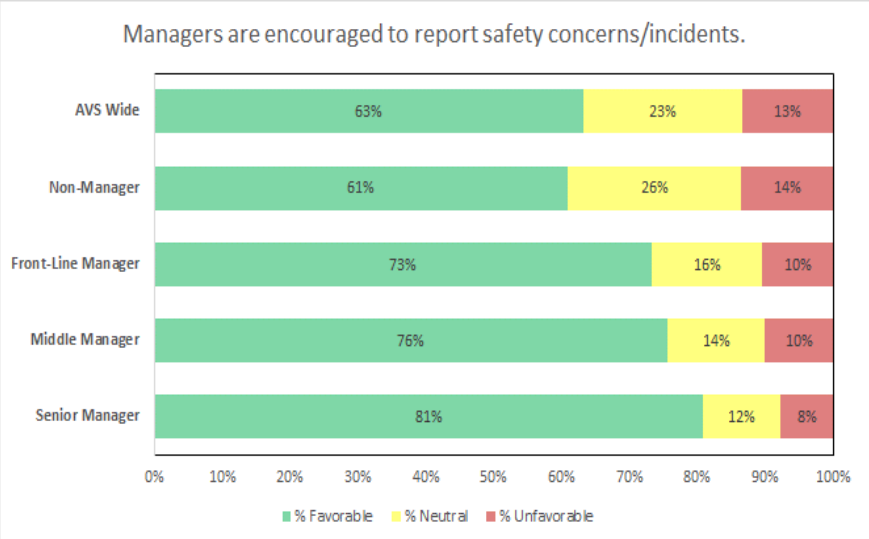
Reporting and Just Culture Questions









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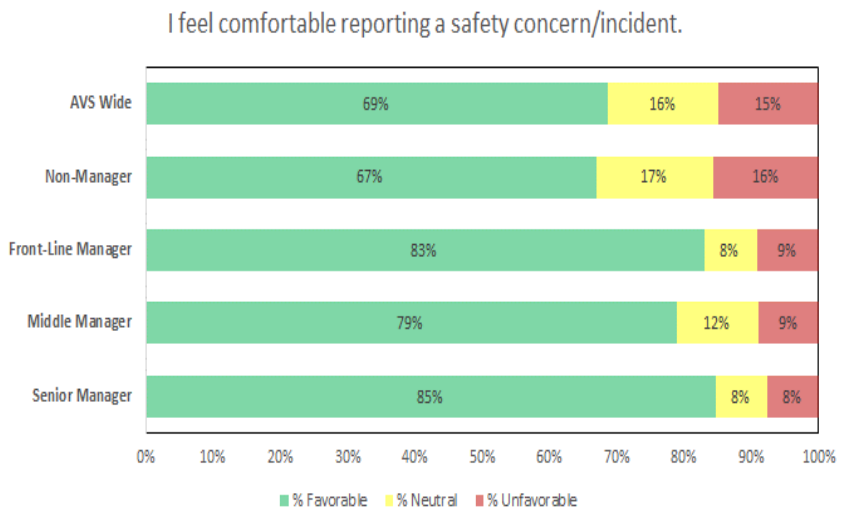
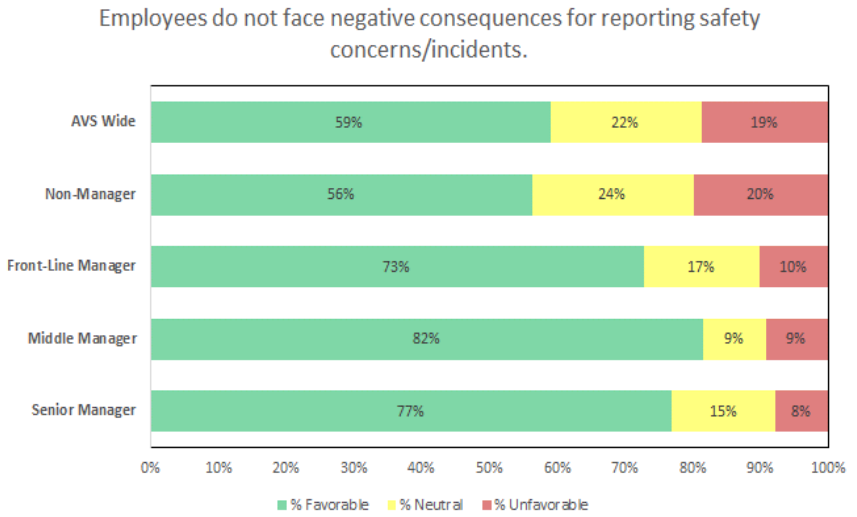
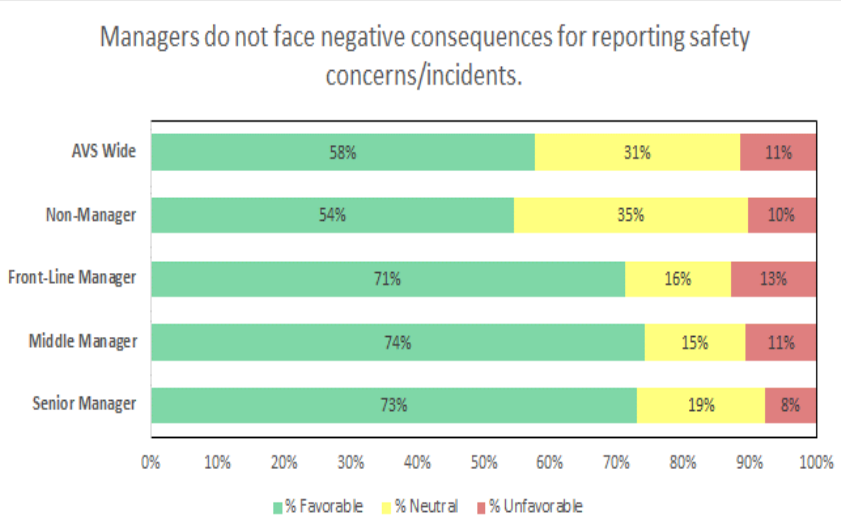
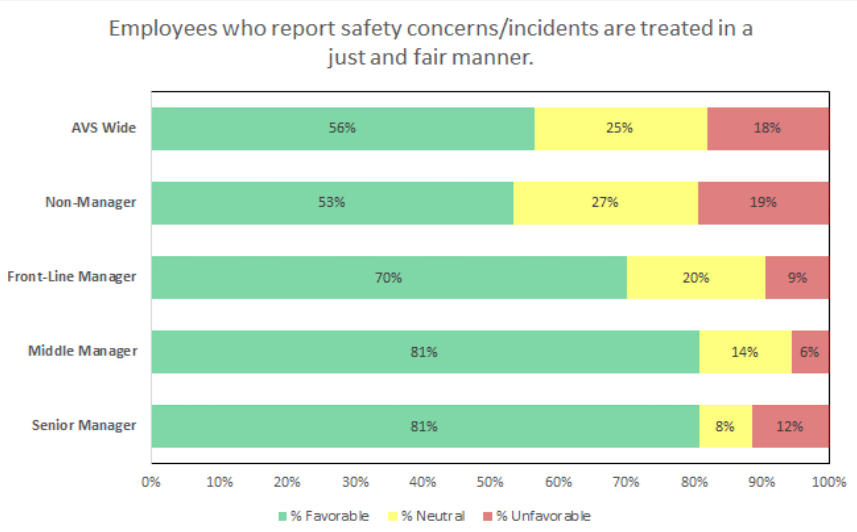
Reporting and Just Culture Questions









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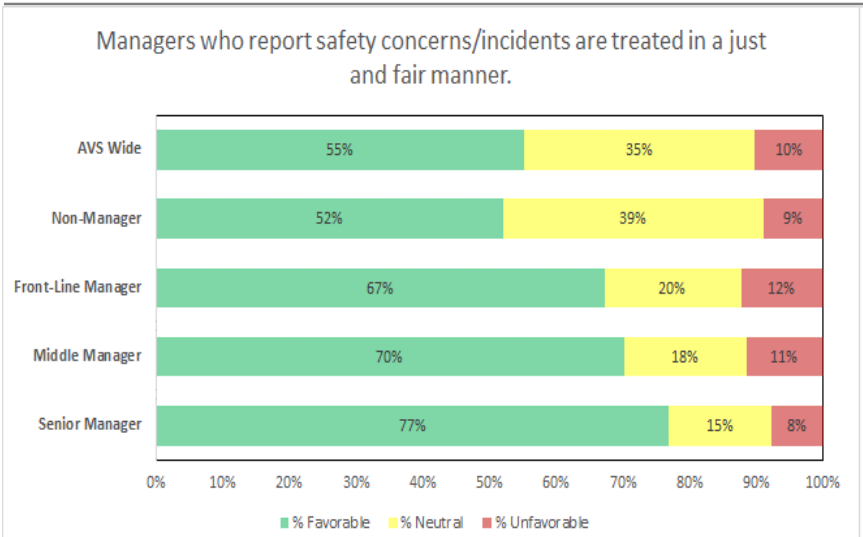
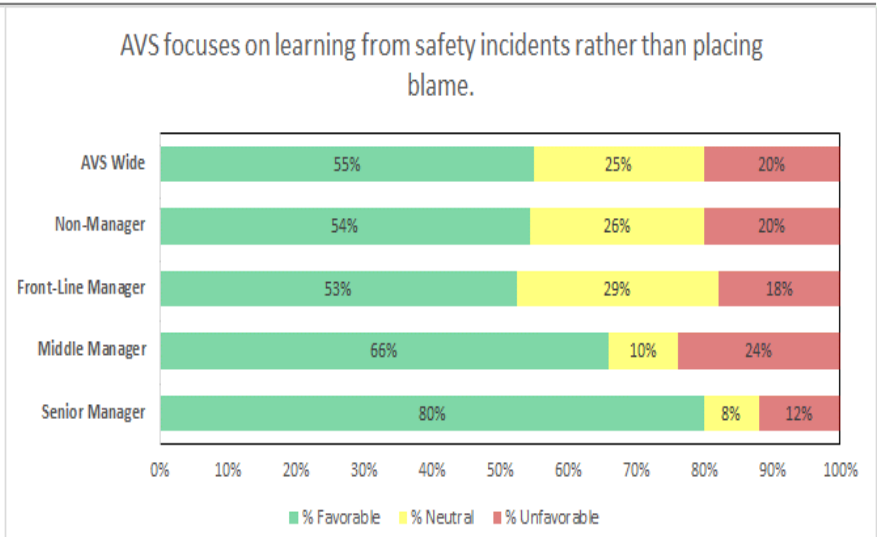
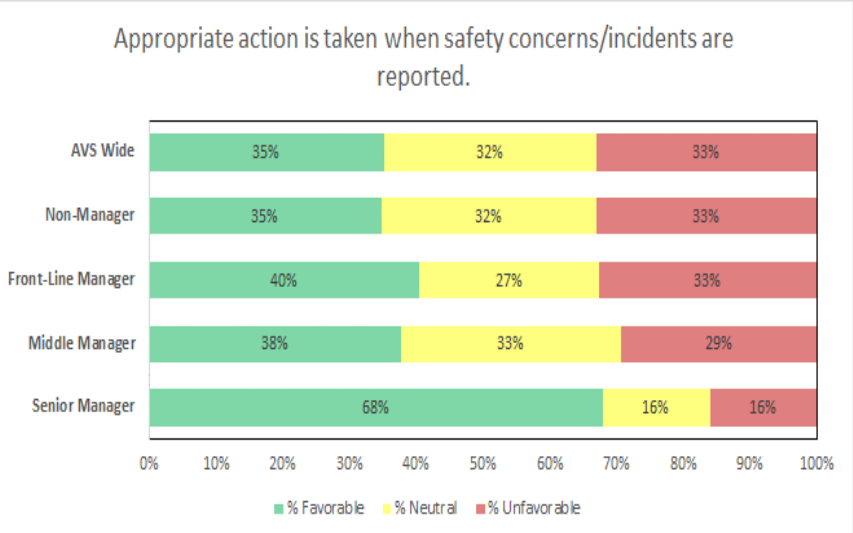
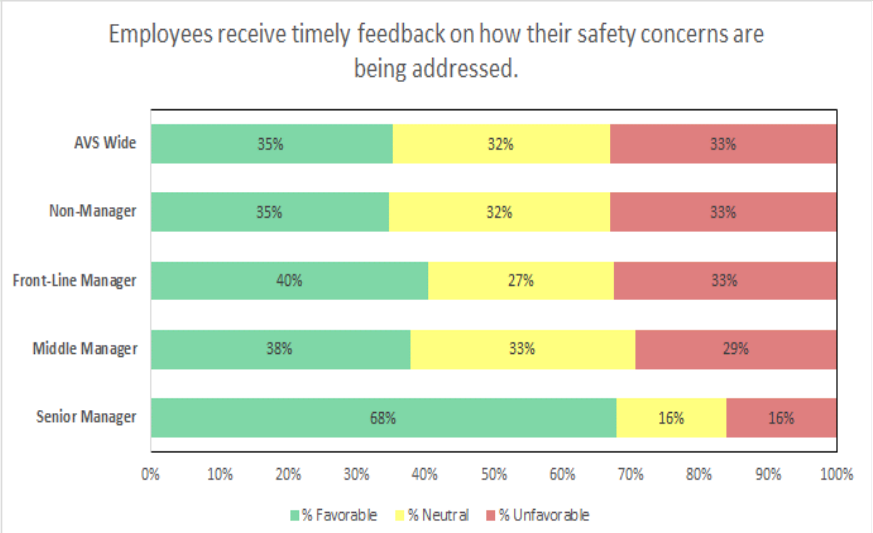
Reporting and Just Culture Questions









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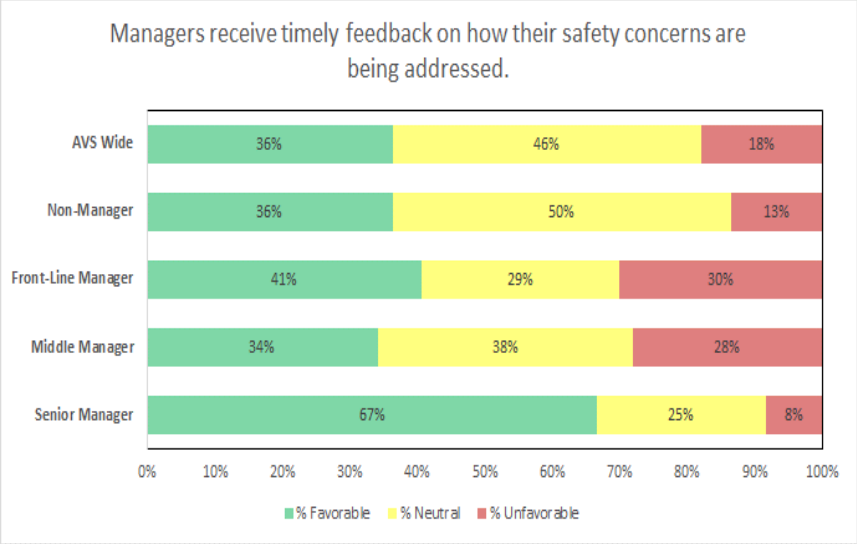
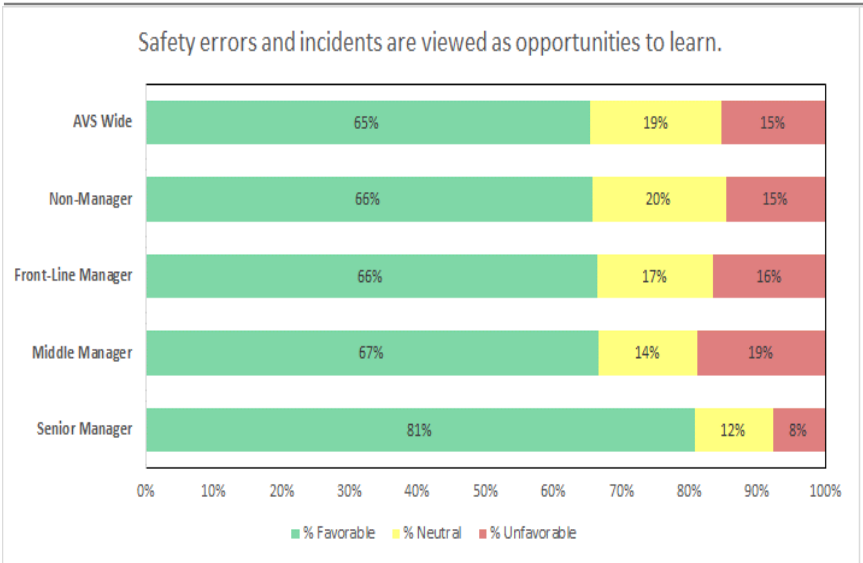
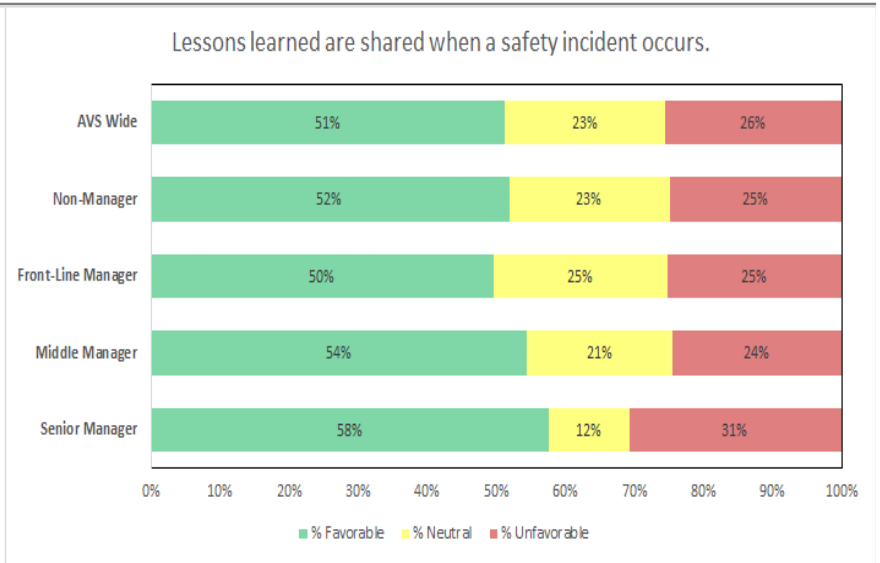
Reporting and Just Culture Questions



Continuous Learning Questions





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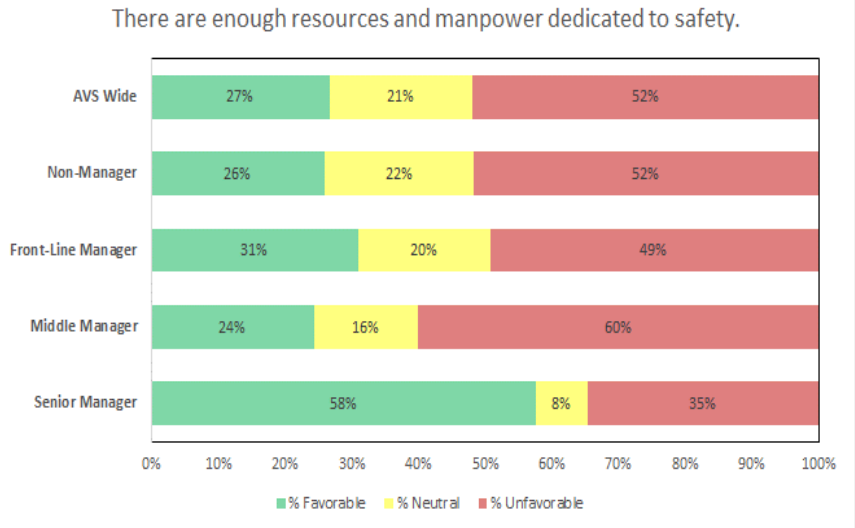

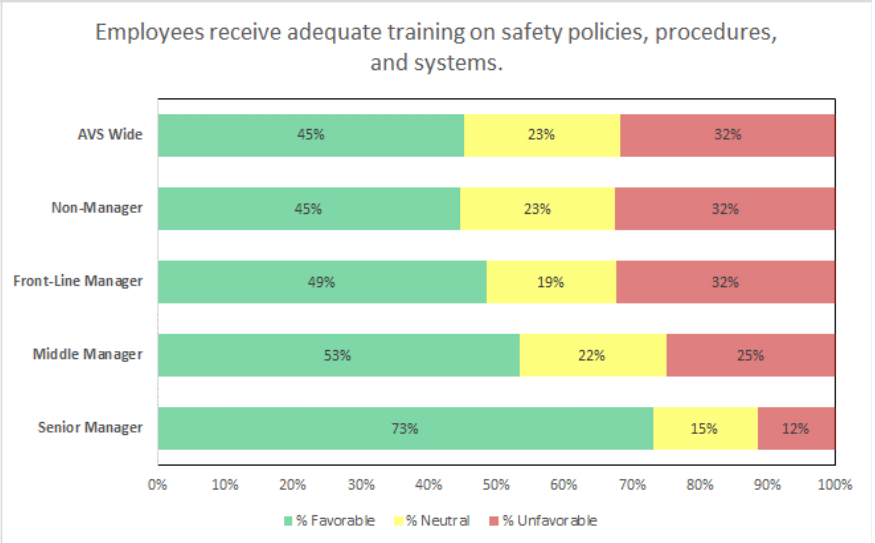

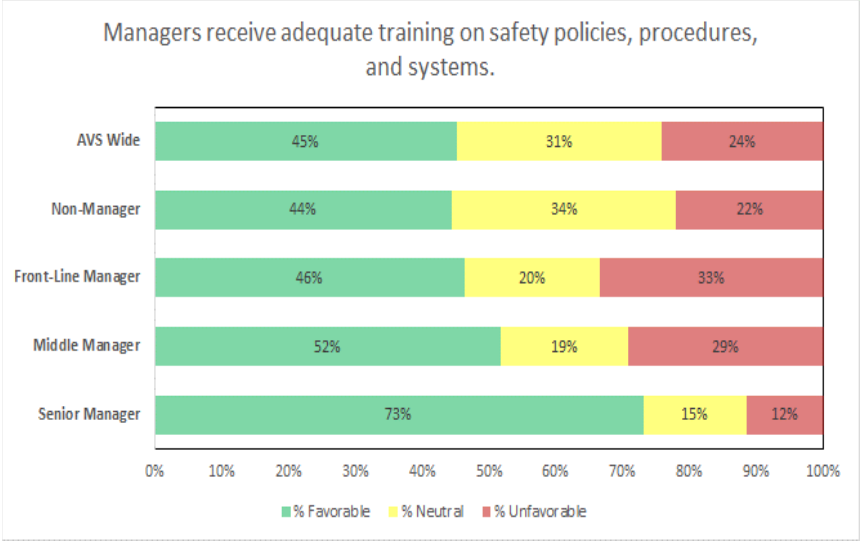

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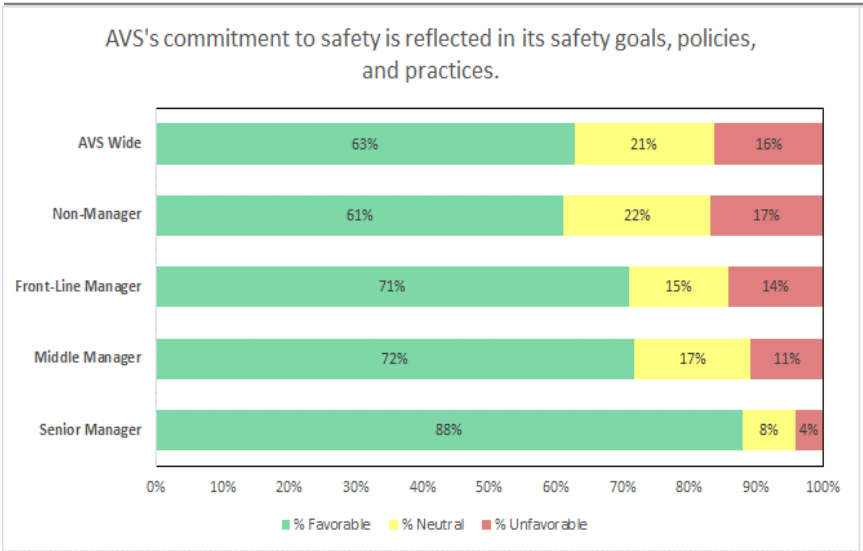

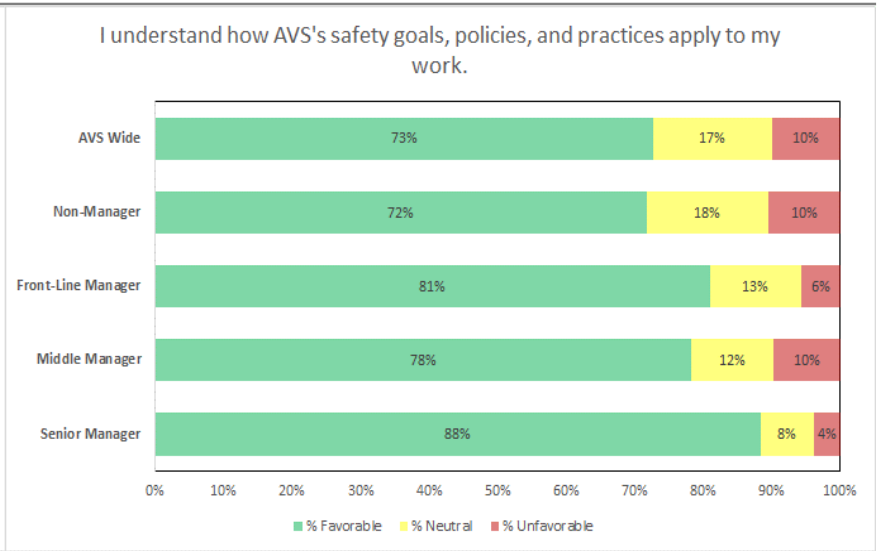

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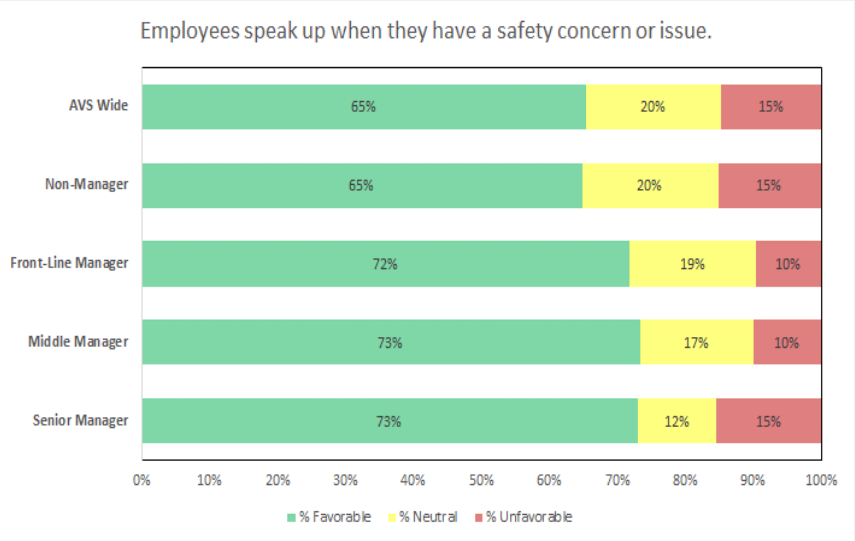
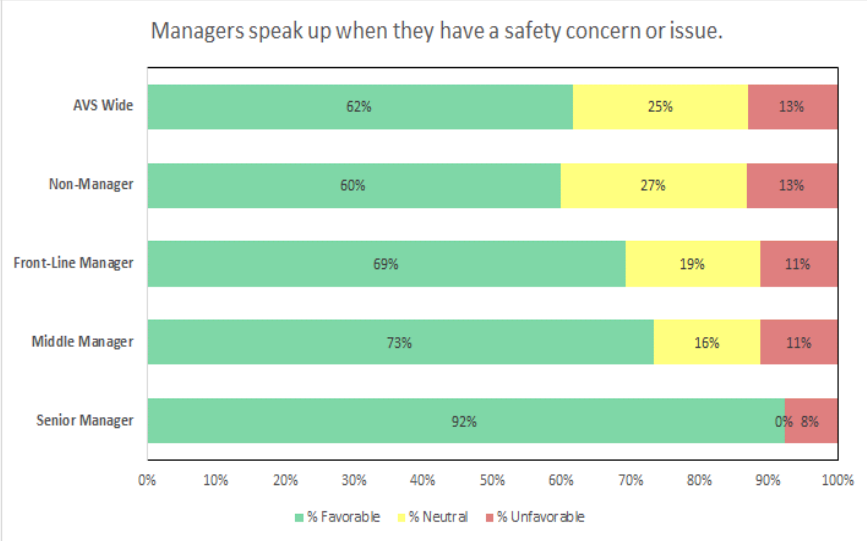
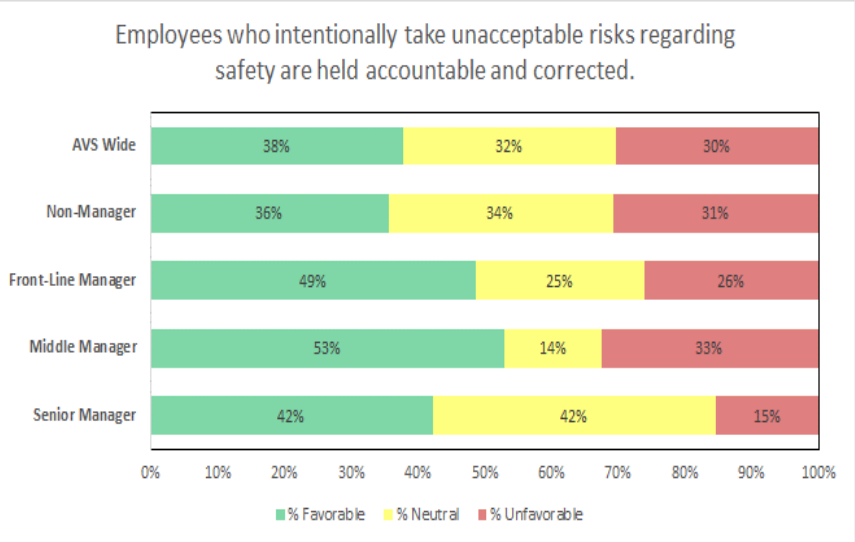
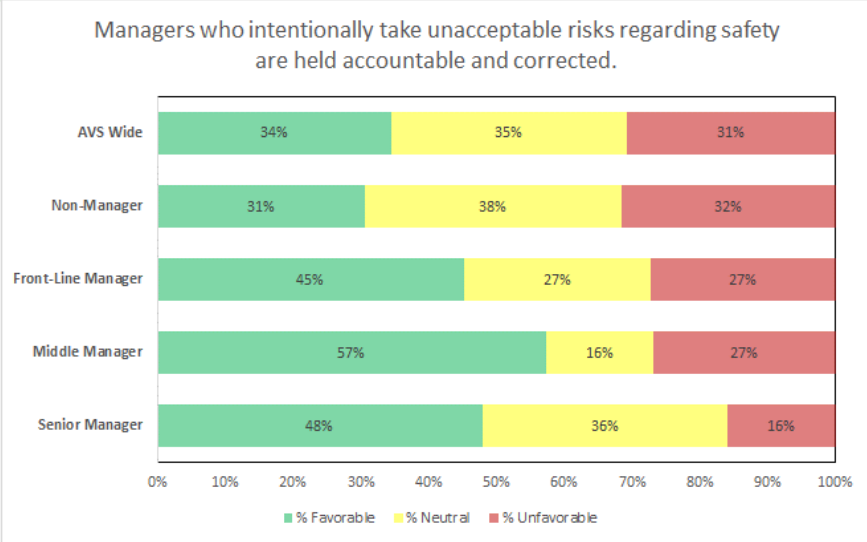
Safety Accountability Questions









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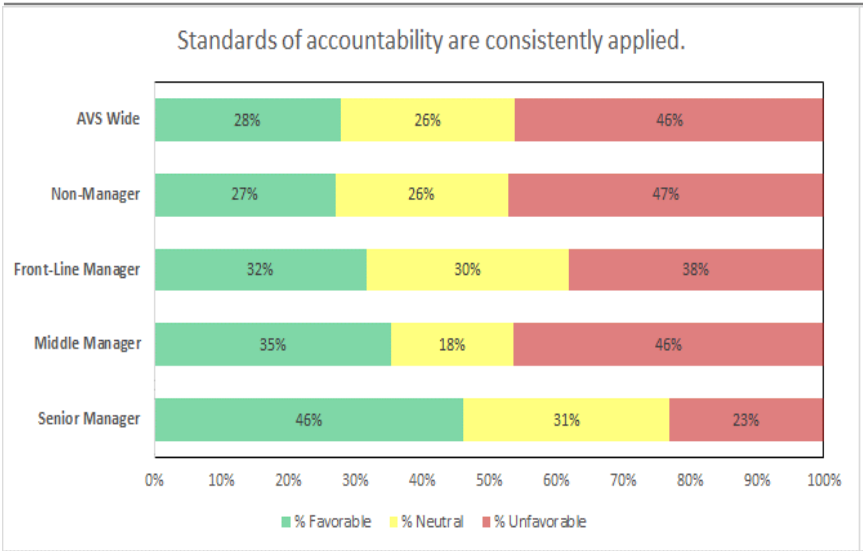
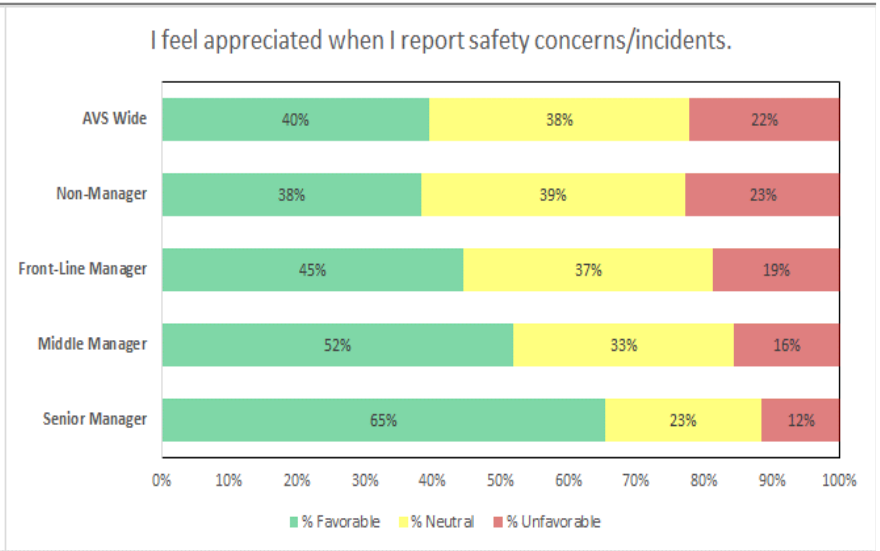
Safety Accountability Questions





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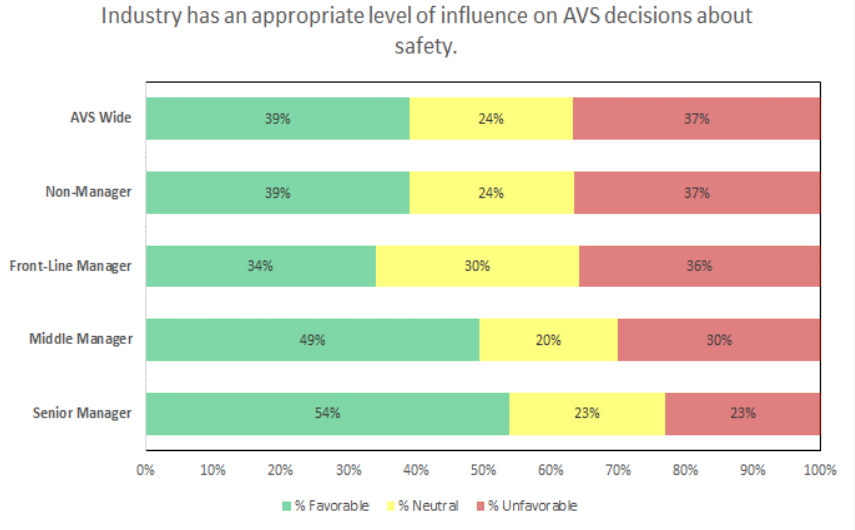
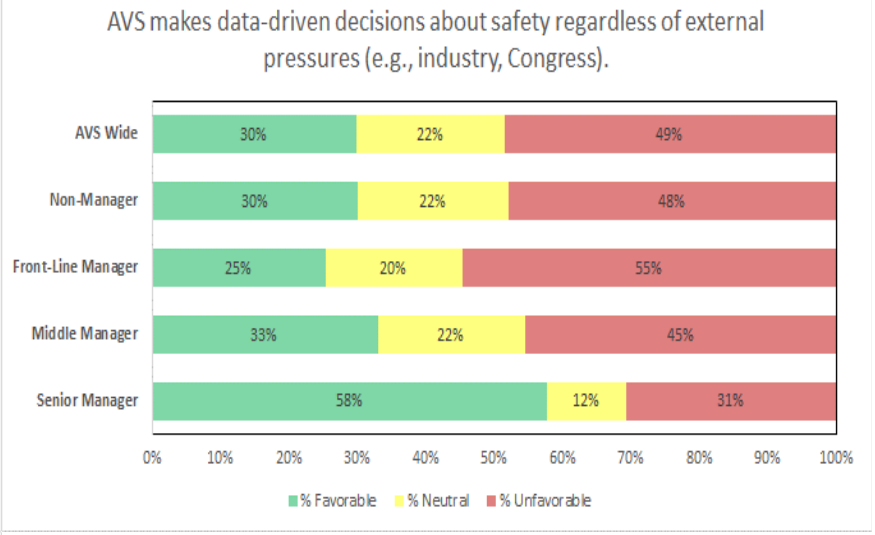
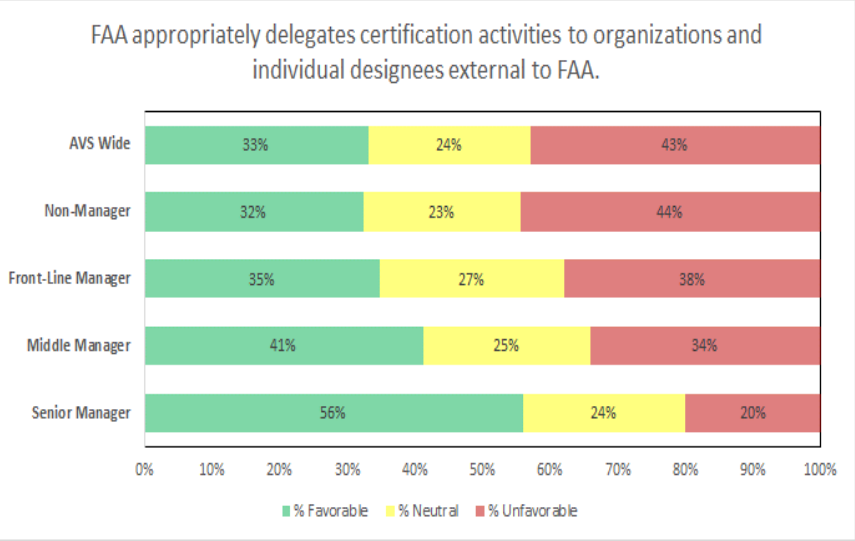
External Influence Questions







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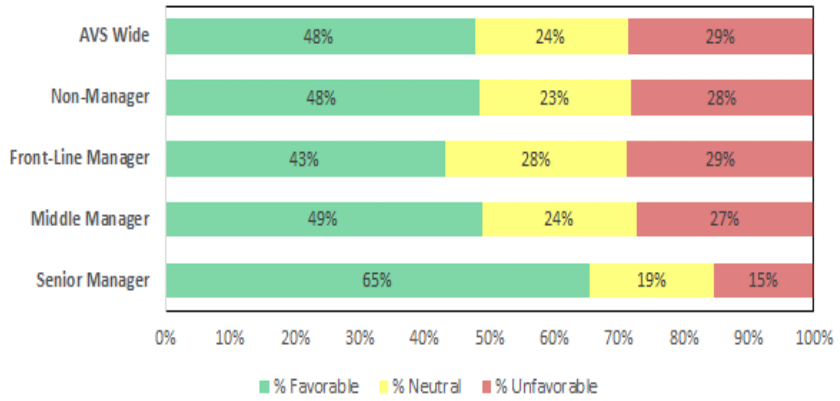
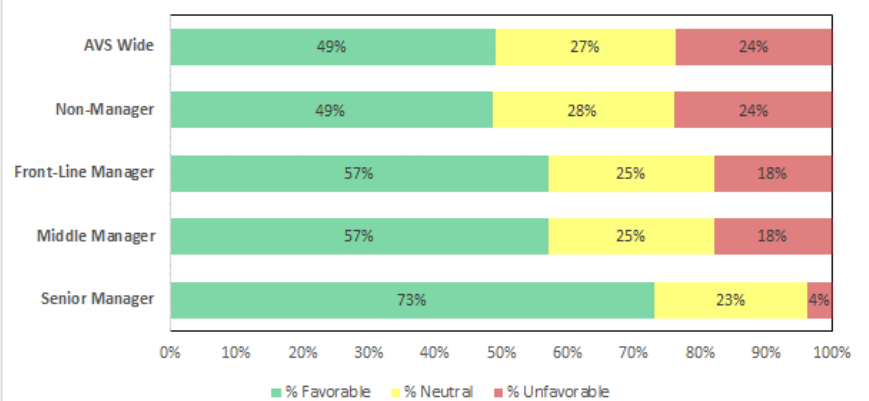
Collaboration Questions





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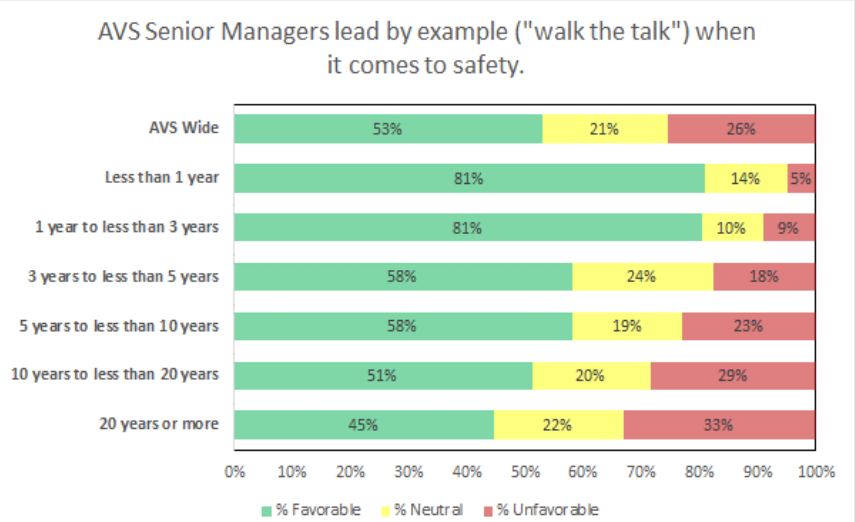
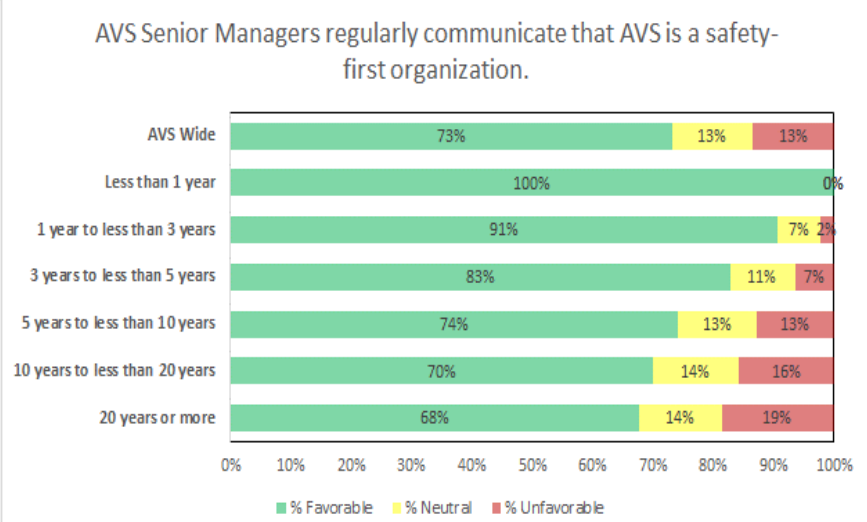
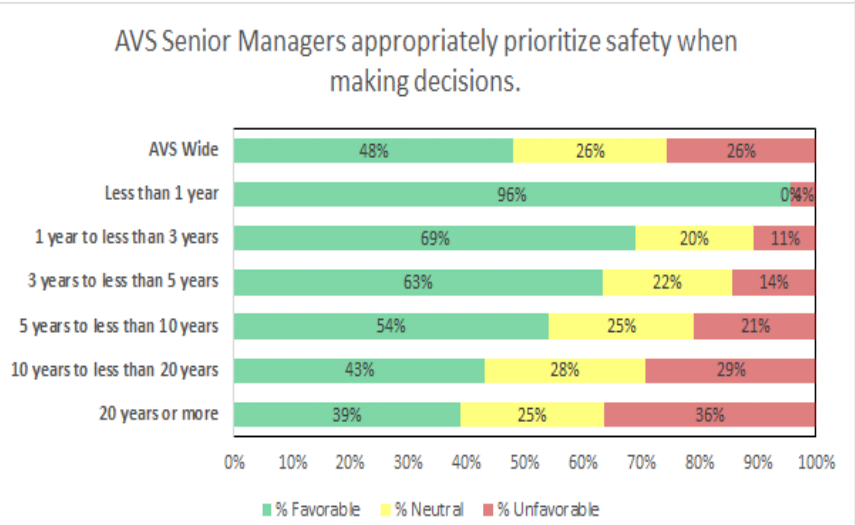
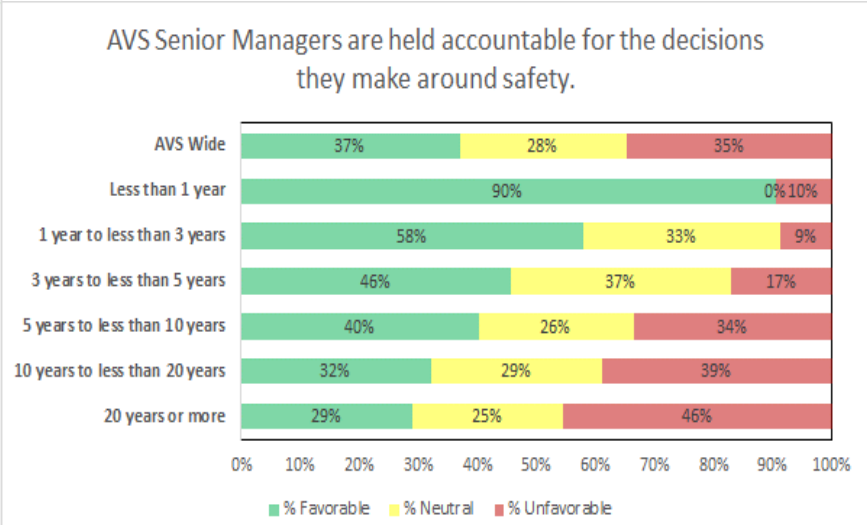
Appendix C: Charts for All Survey Questions by Tenure

Leadership Commitment to Safety Questions









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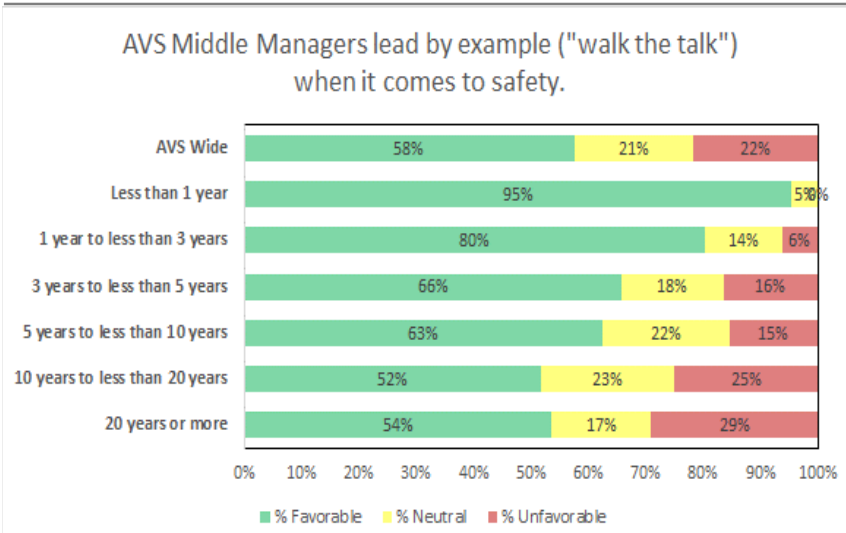
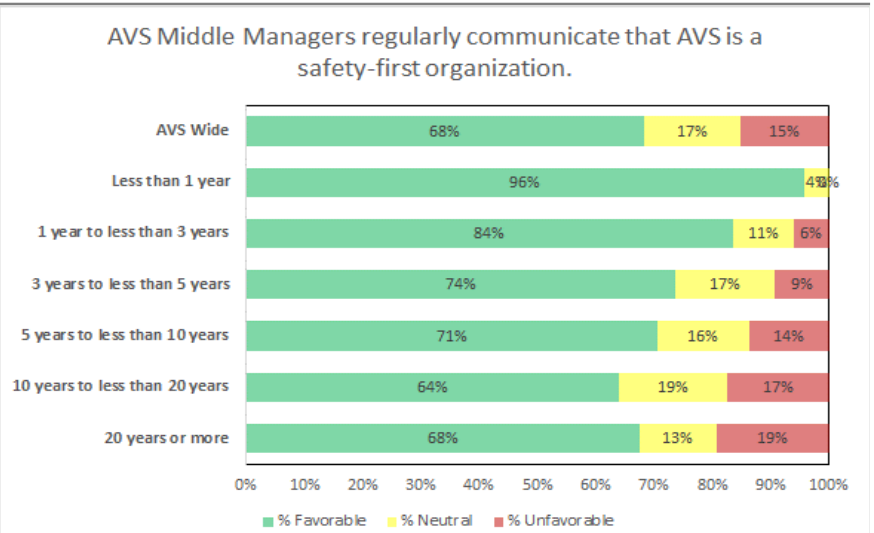
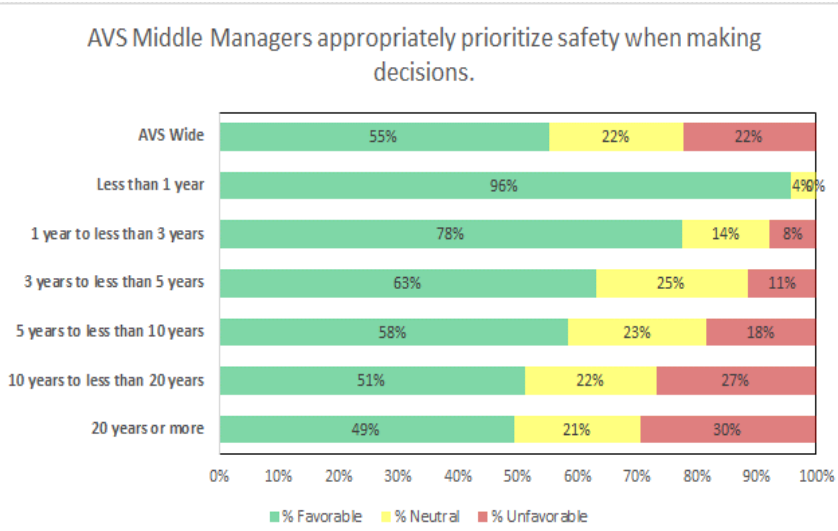
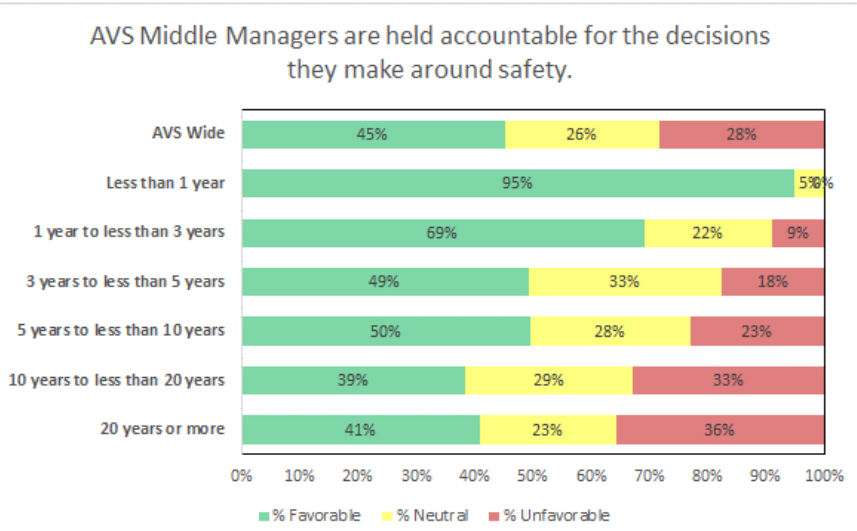
Leadership Commitment to Safety Questions









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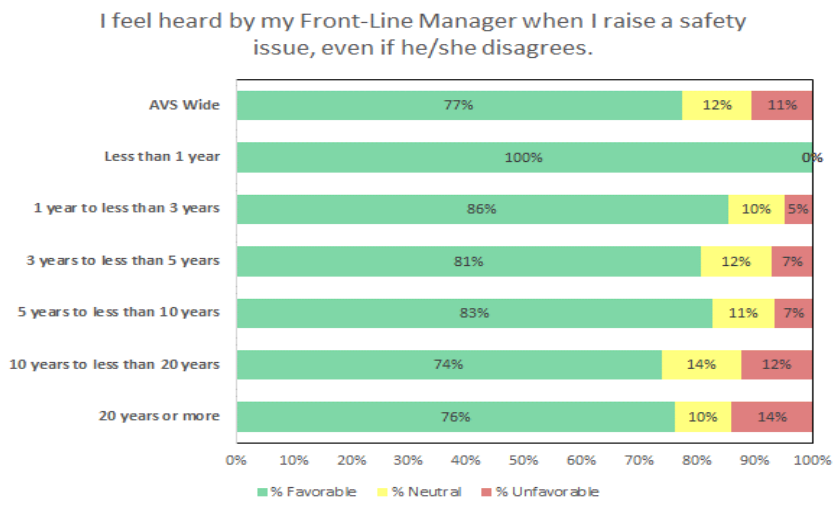
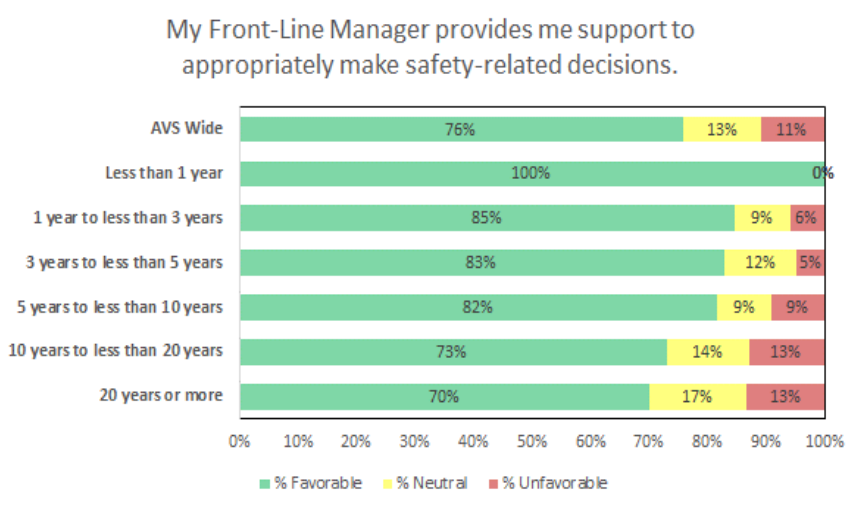
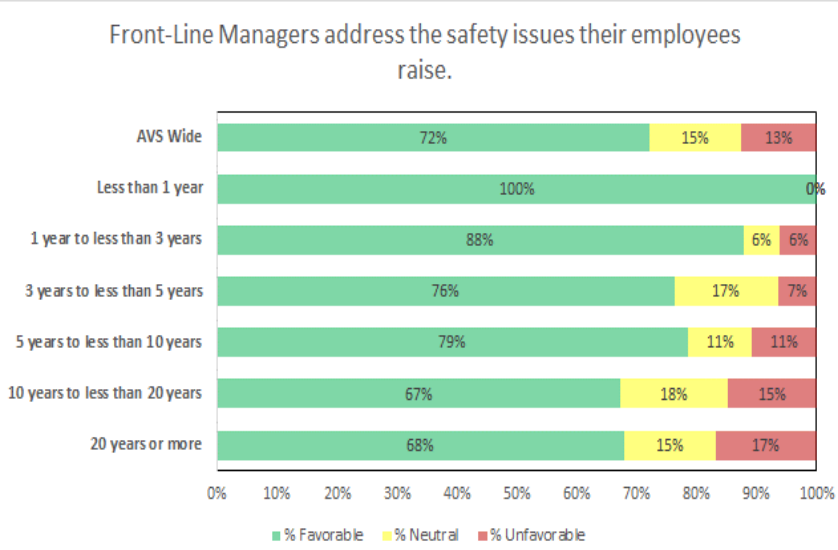
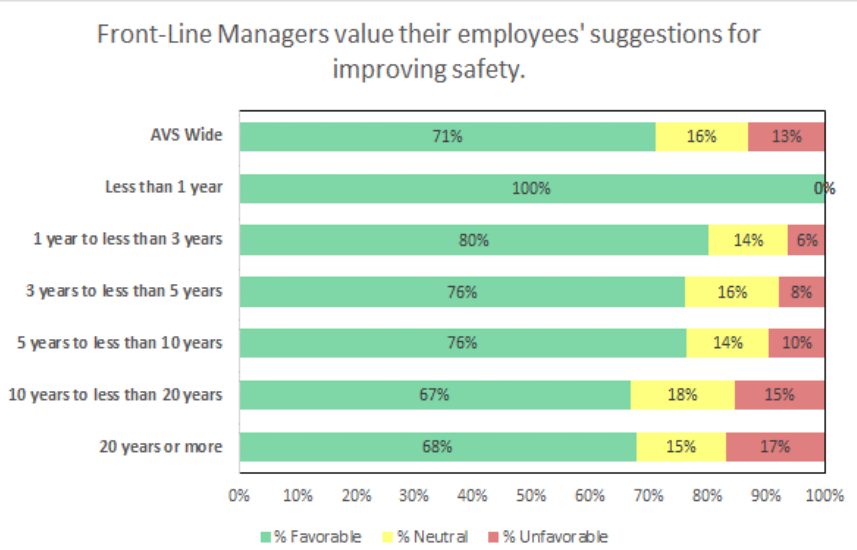
Front Line Manager Support for Safety Questions









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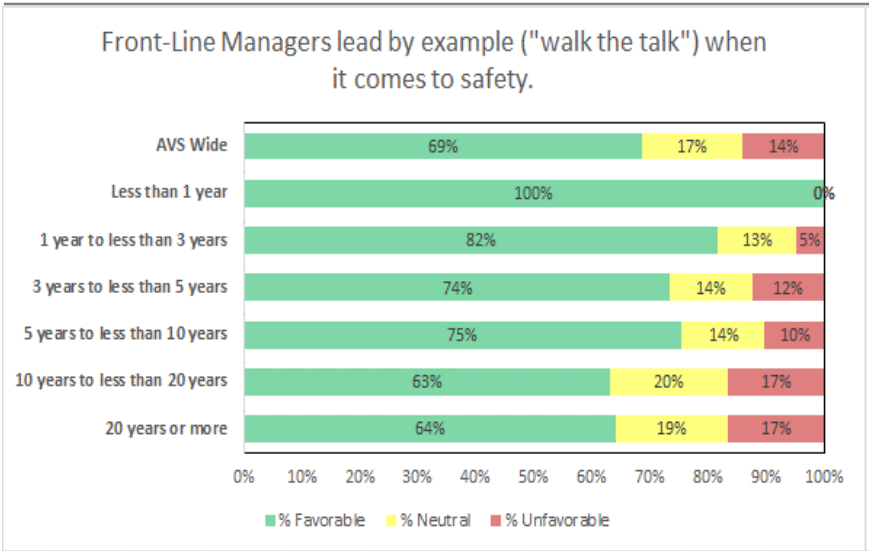
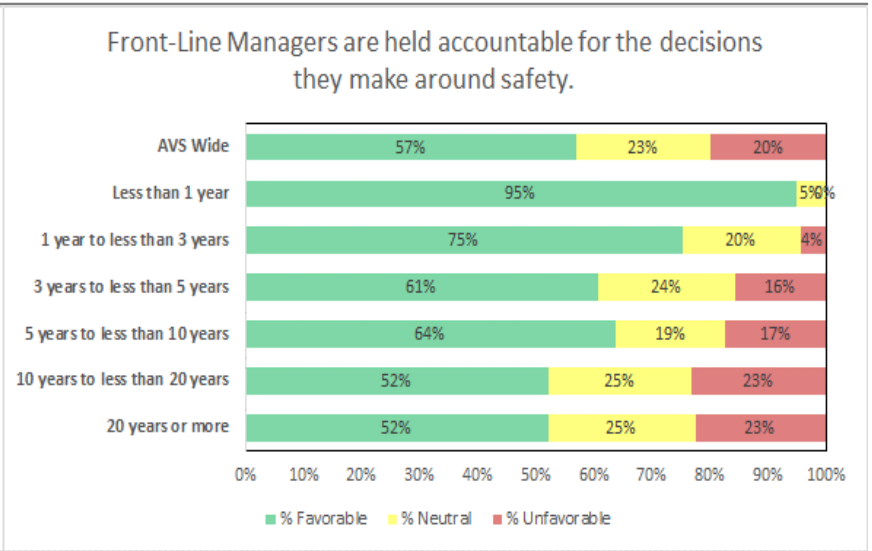
Front Line Managers Questions





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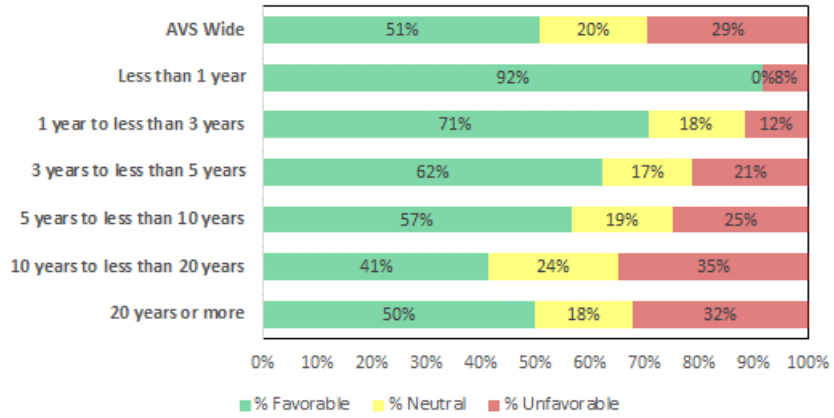
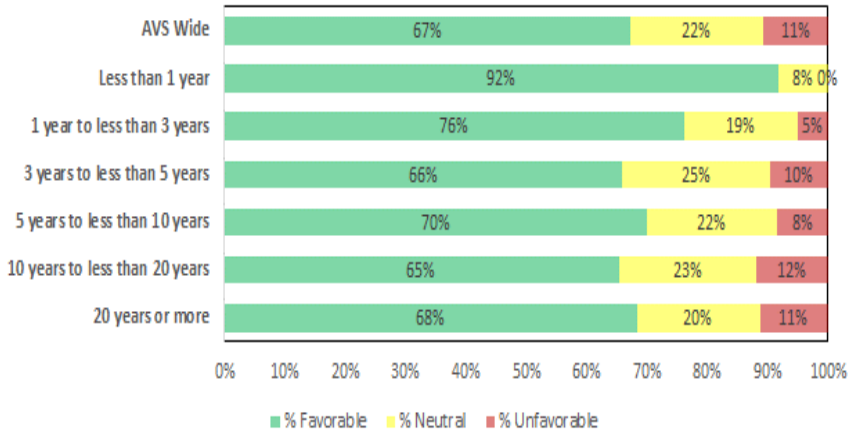
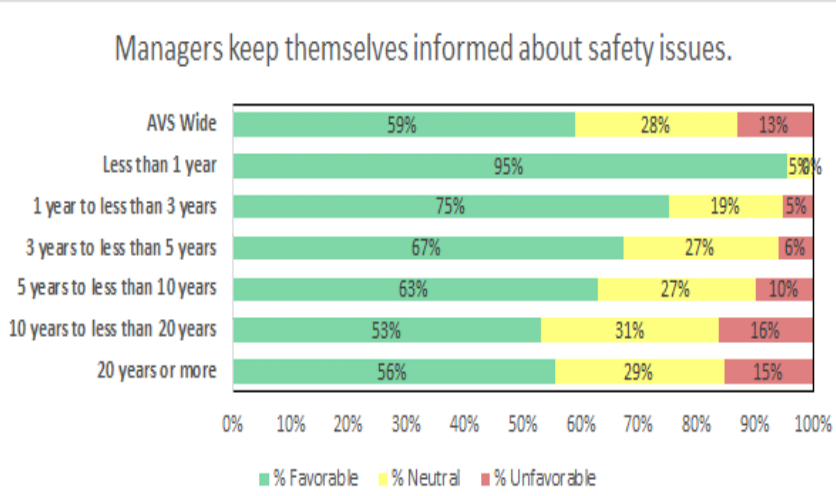
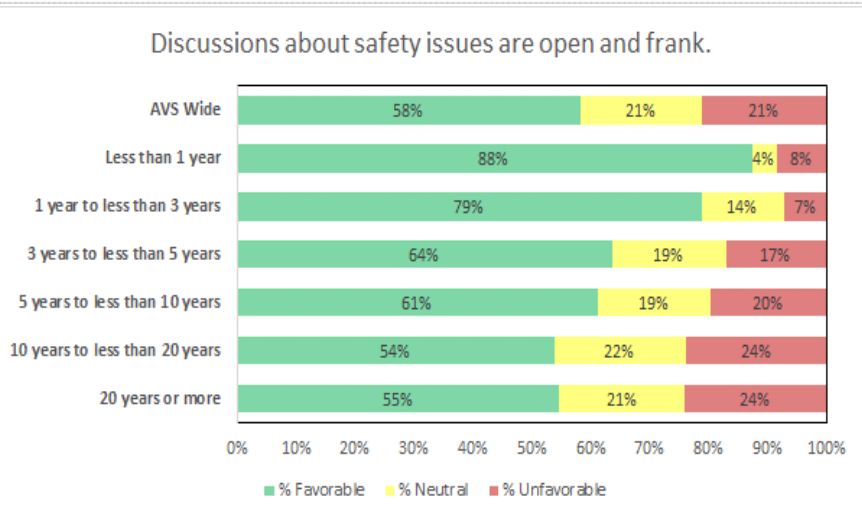
Open Communication Questions









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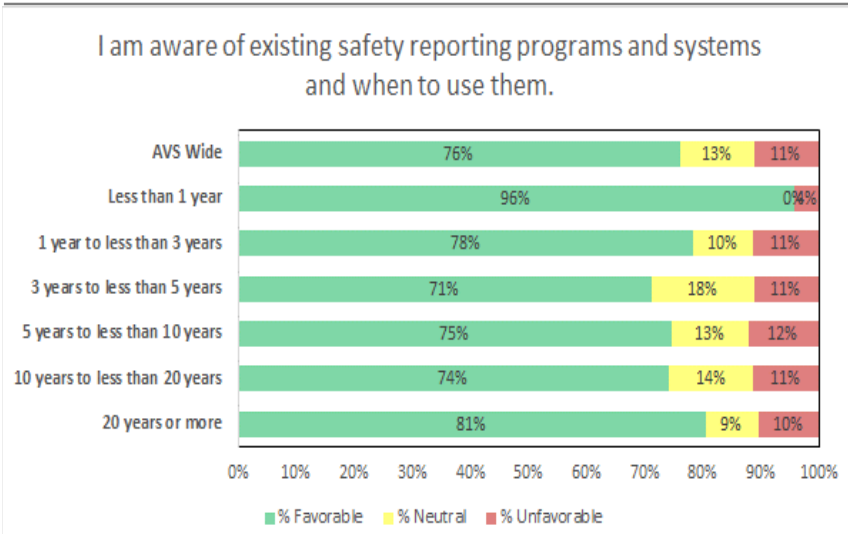
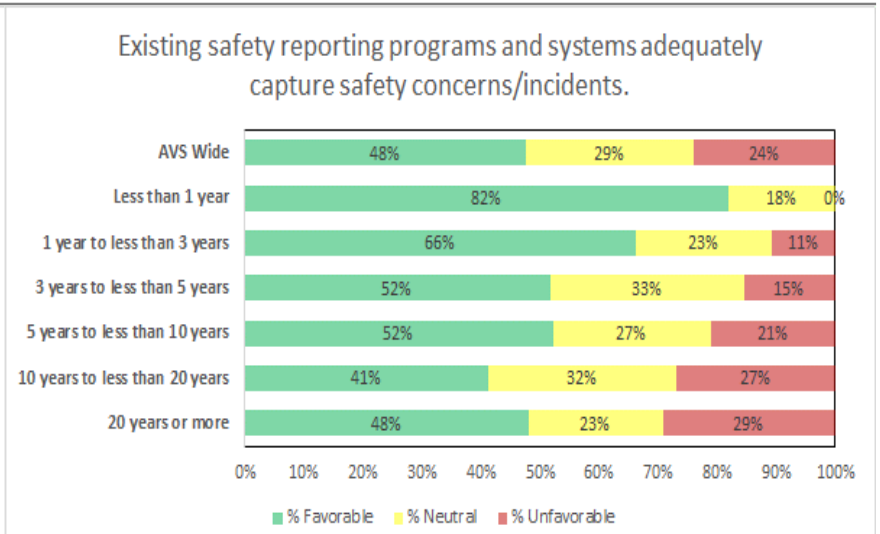
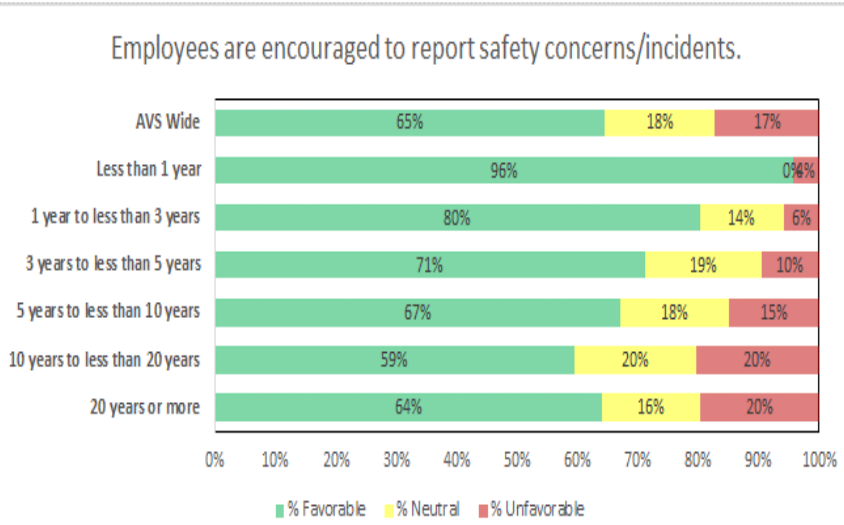
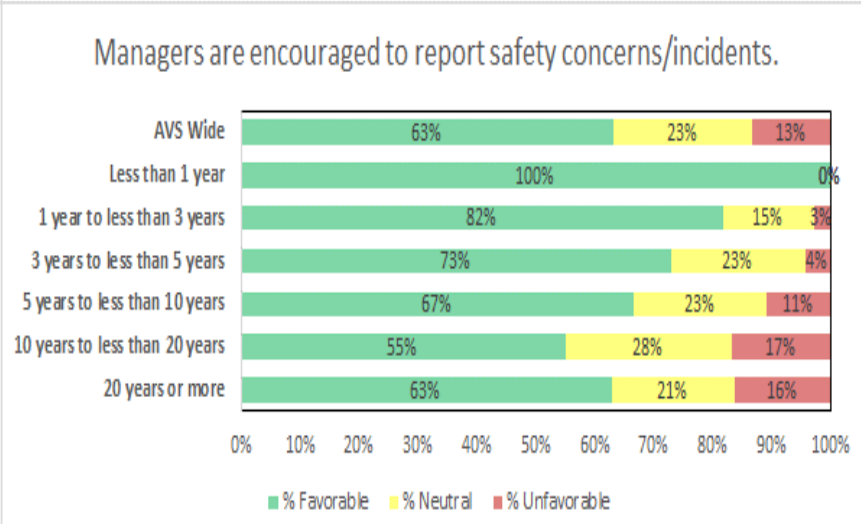
Reporting and Just Culture Questions









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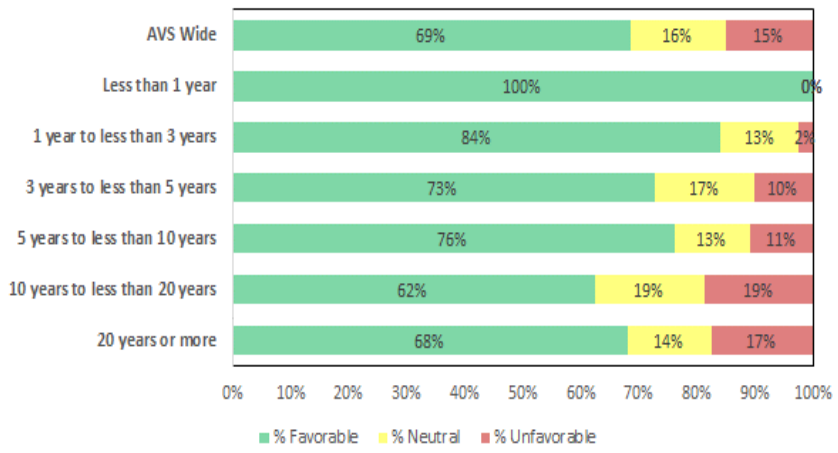

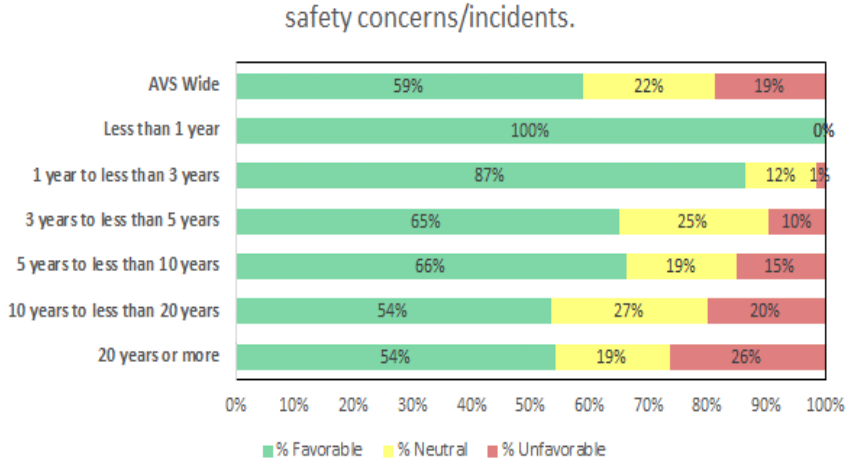

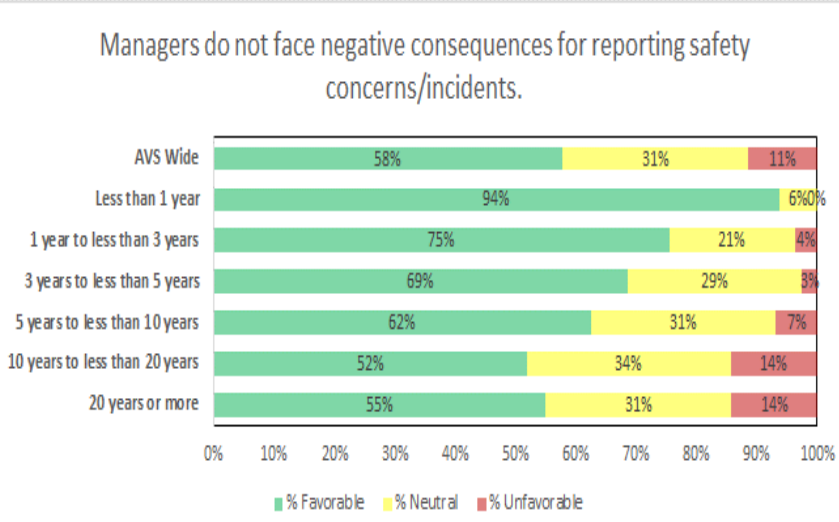

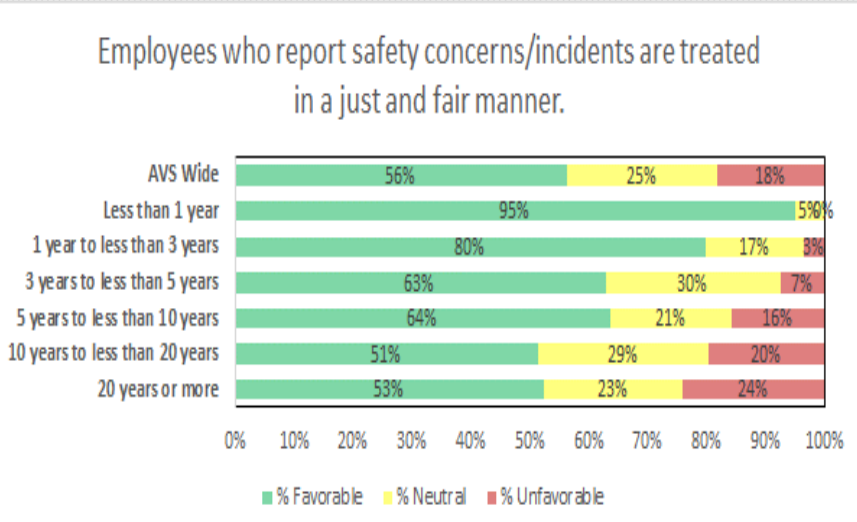

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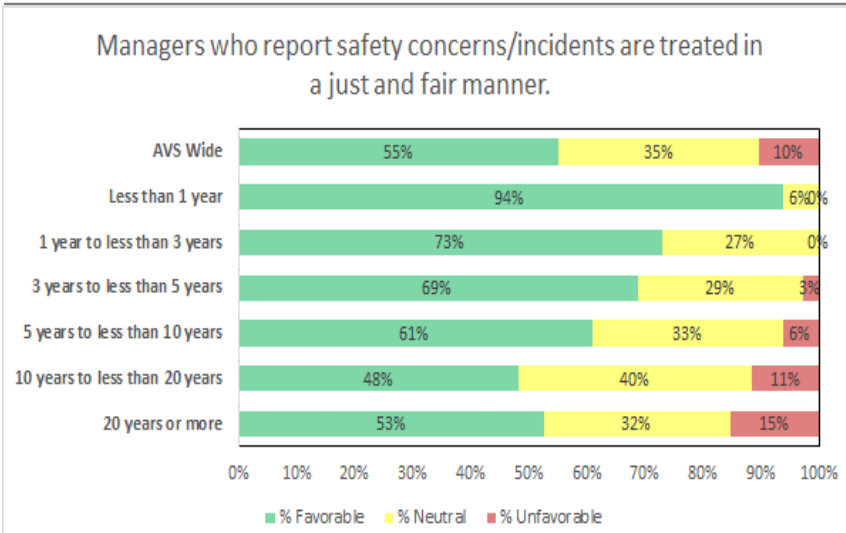

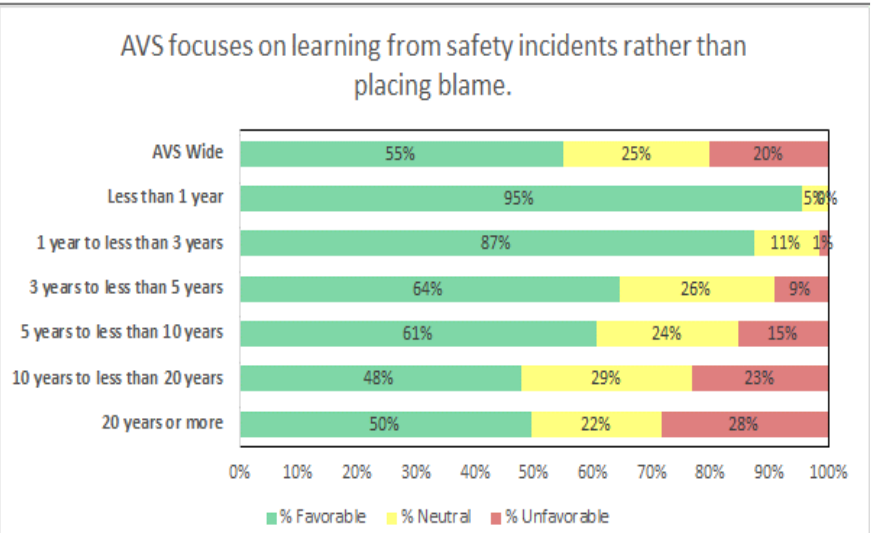

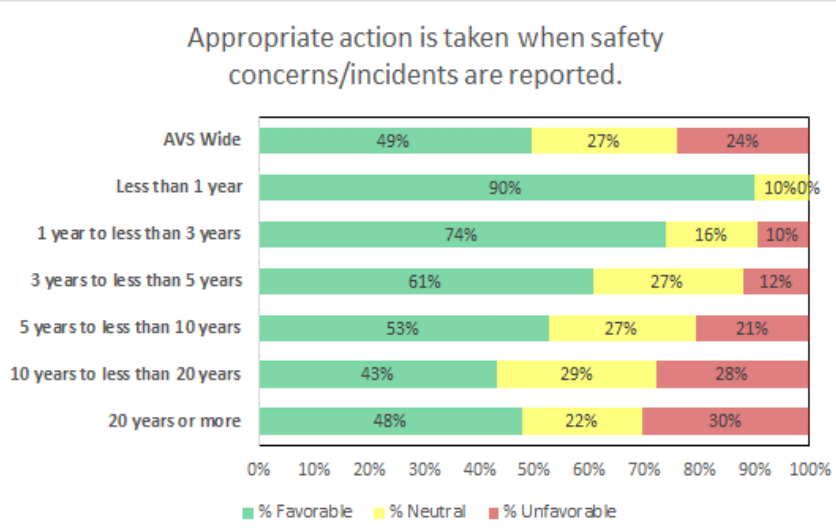

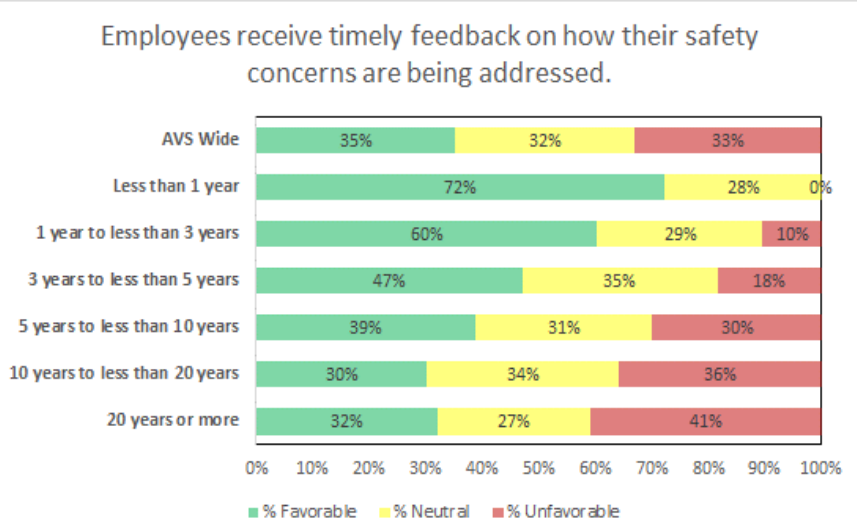

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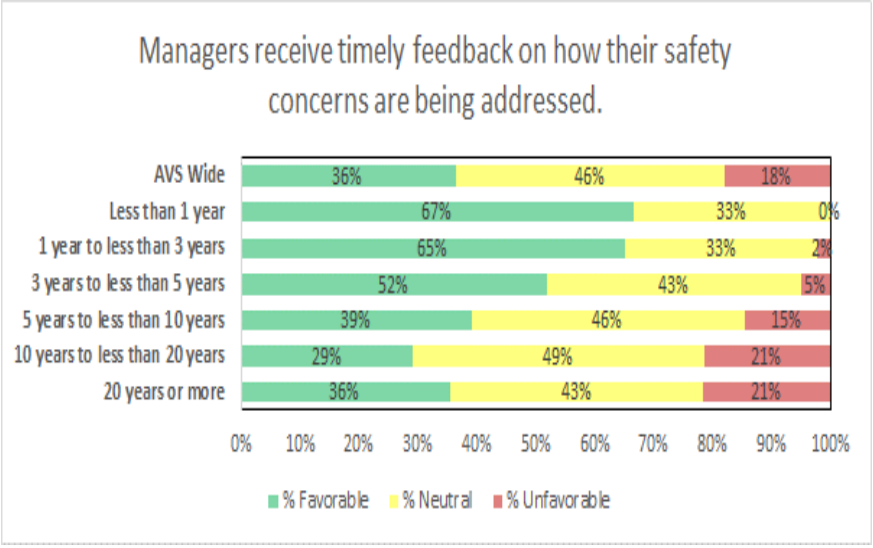

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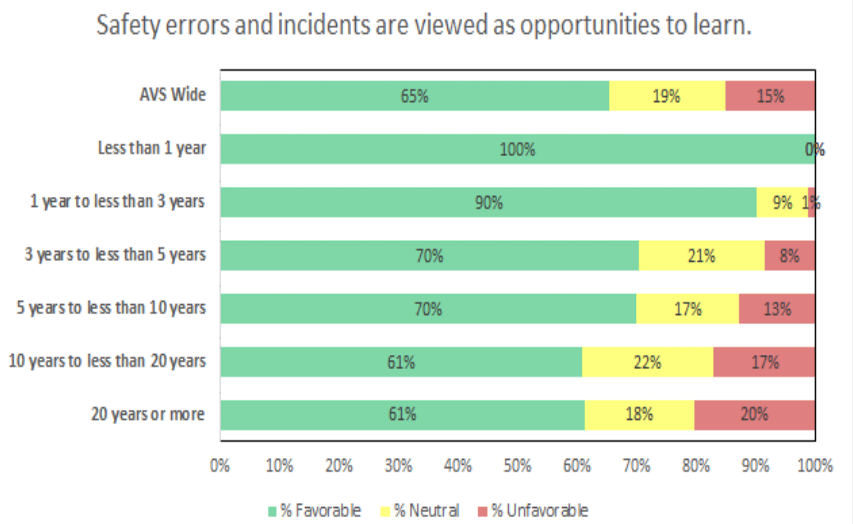
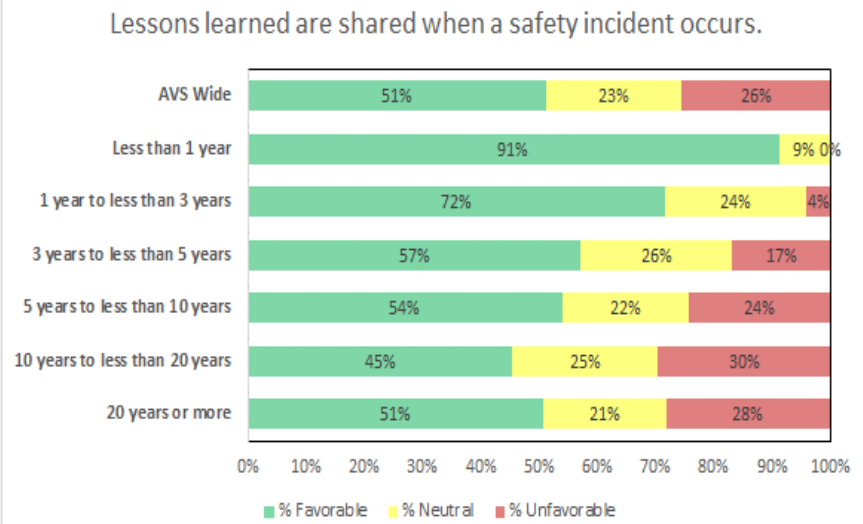
Continuous Learning Questions





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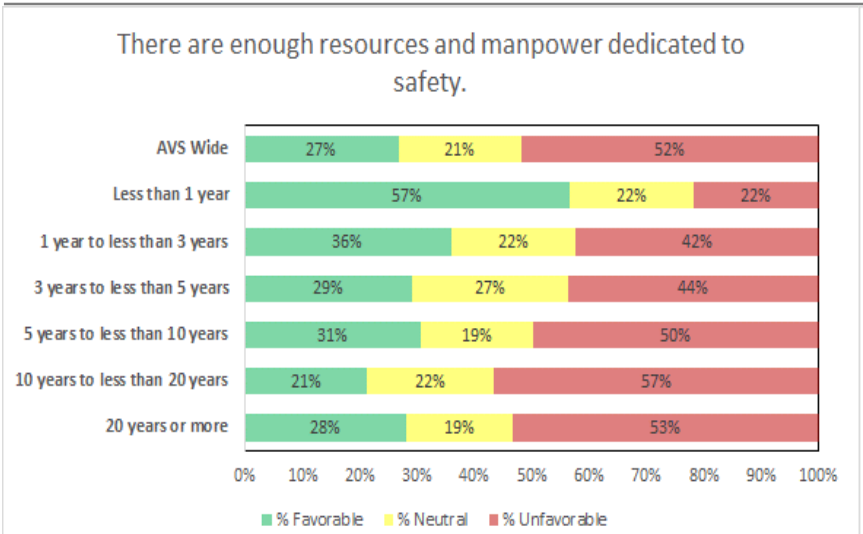
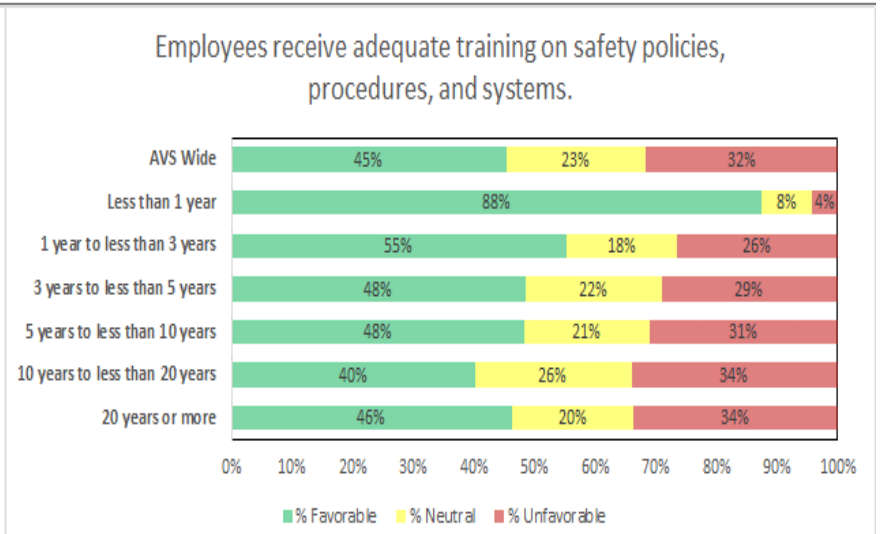
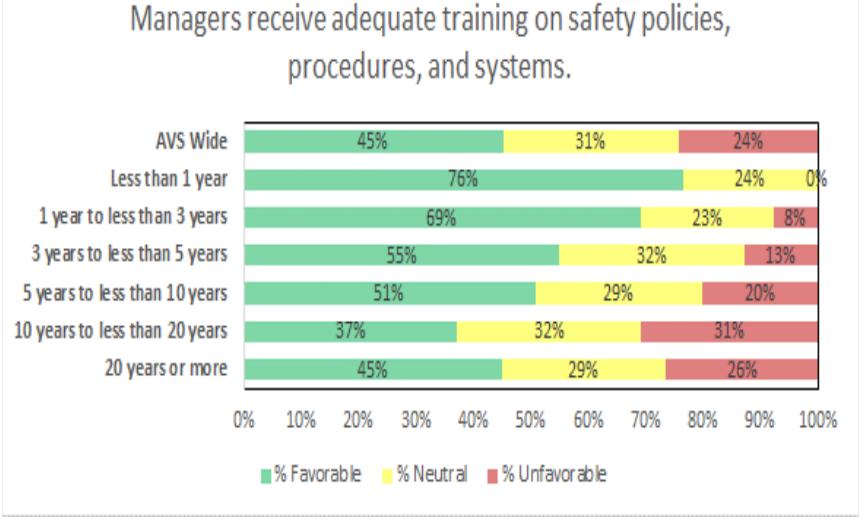
Training and Resources Questions







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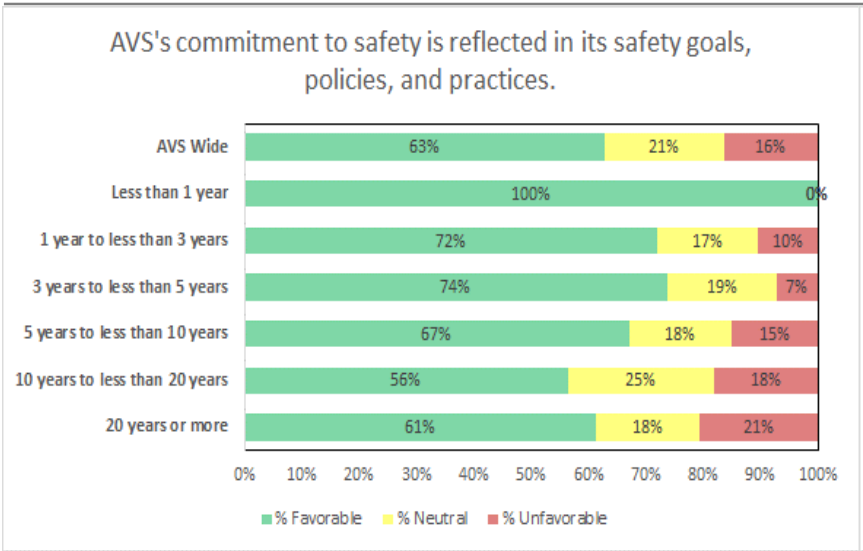
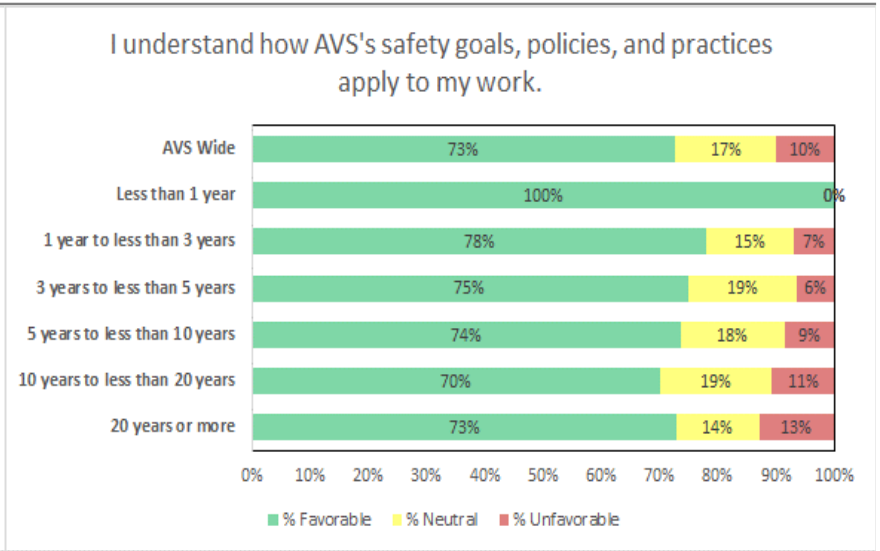
Safety Policies and Procedures Questions





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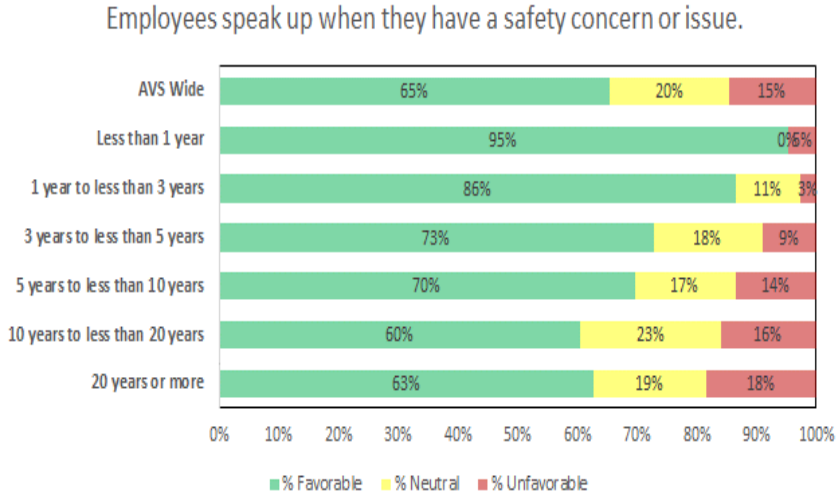
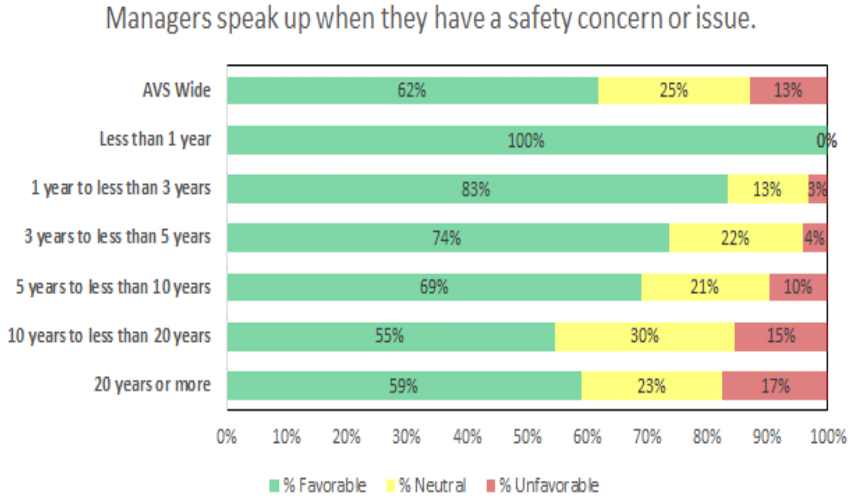
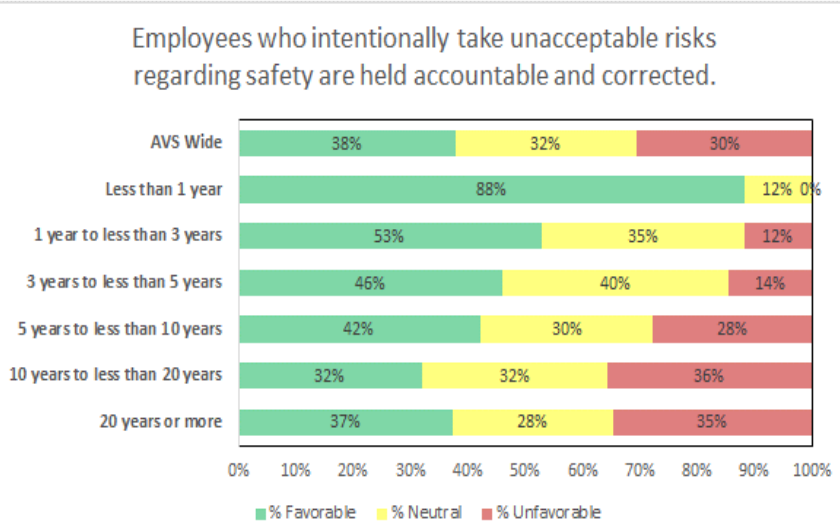
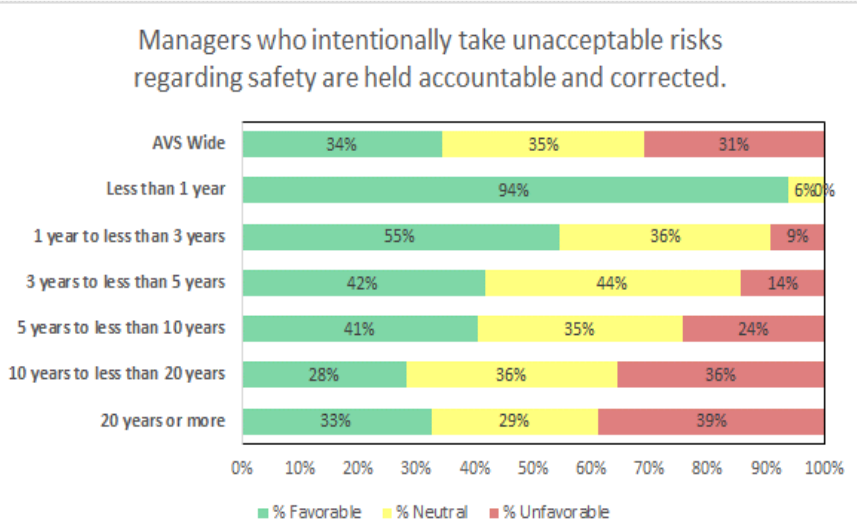
Safety Accountability Questions









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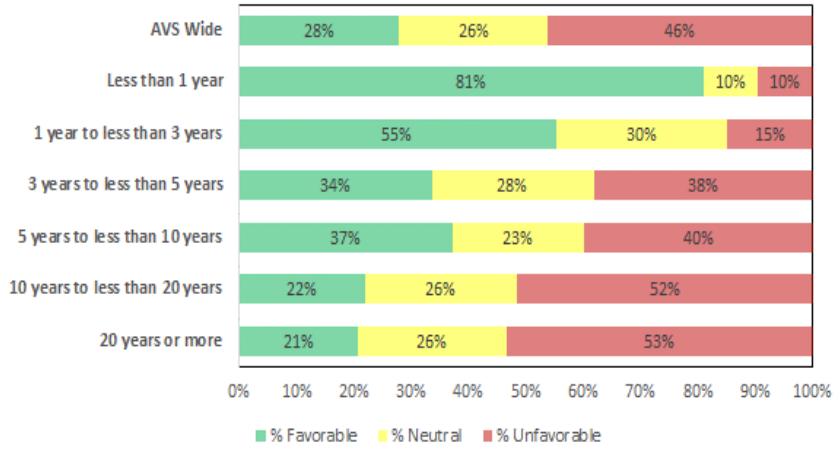
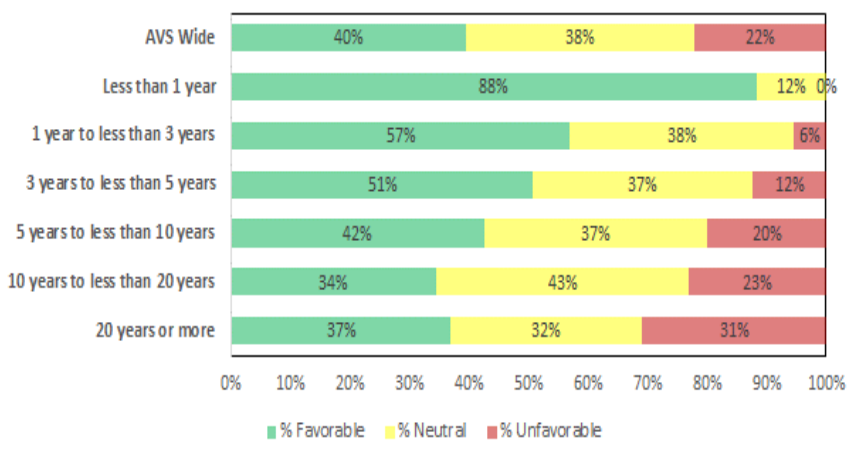
Safety Accountability Questions





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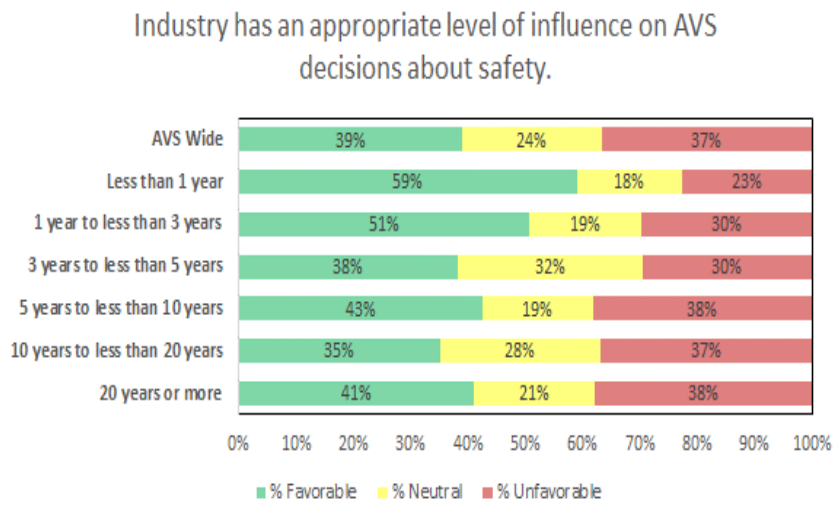
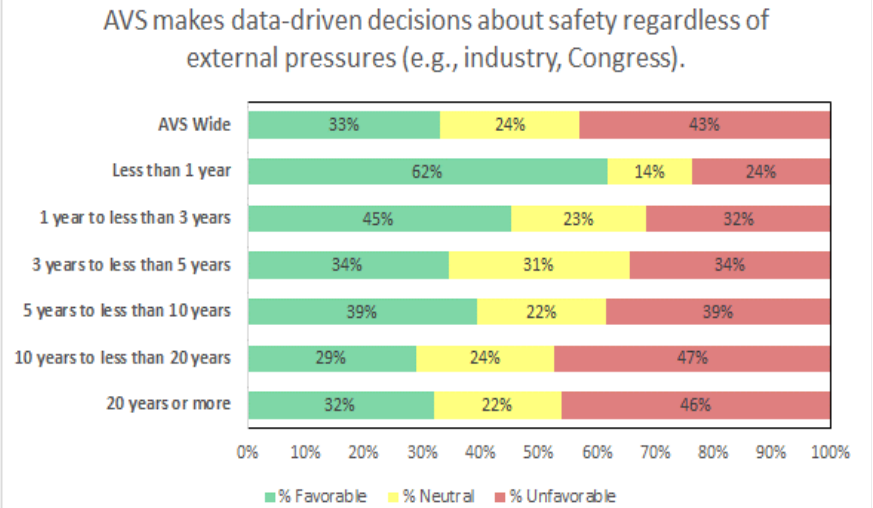
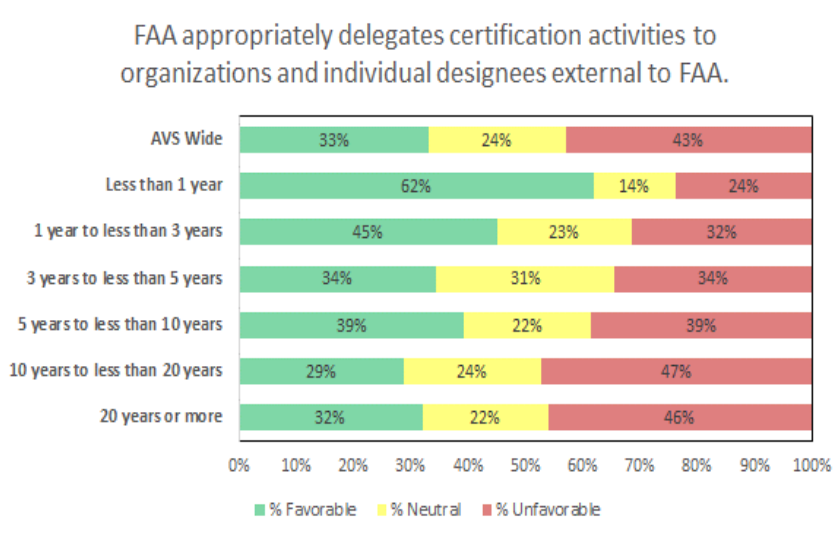
External Influence Questions







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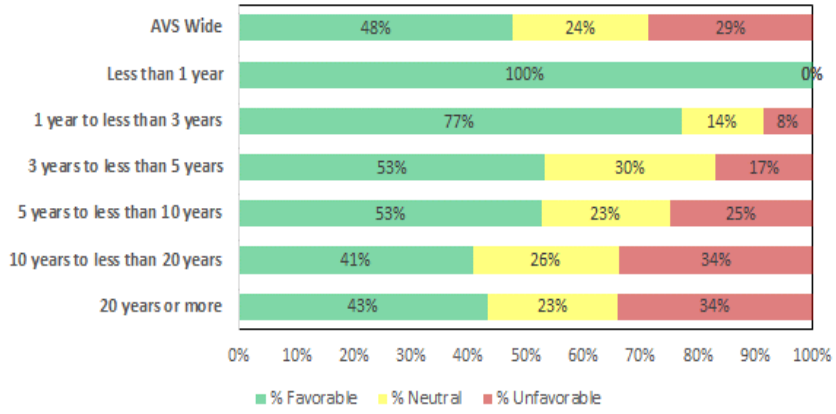
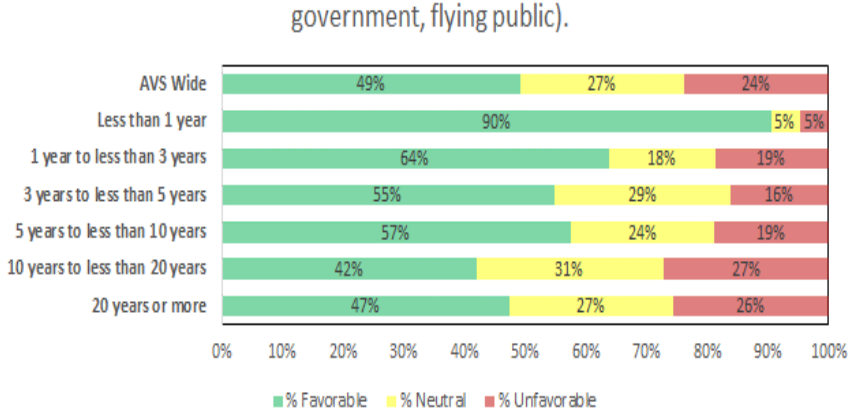
Collaboration Questions





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