HUMAN FACTORS ASSOCIATES, Inc.

Professionals dedicated to improving performance of high-risk organizations

ORGANIZATIONAL SAFETY EFFECTIVENESS SURVEY – OSES[1]

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General Background of the Organizational Safety Effectiveness Survey

Organizational Safety Effectiveness Survey (OSES) is a copyrighted survey instrument that was based originally on the US Naval Aviation Command Safety Survey (CSA). The CSA was developed in 1997 to assess a naval aviation squadron's safety climate. Modified versions of the CSA are still in use by the U.S. Navy (Ciavarelli, and Figlock, 1997). At the time that the CSA was developed, Dr. Ciavarelli worked with experts (Roberts 1993, 1990) to lay the foundation for development of CSA. The CSA was based upon principles of a High – Reliability Organization (Roberts and Bea, 2001), and upon studies of organizational climate and safety culture (Zohar, 2010, 1980; Flin, Mearns, O'Connor, and Bryden, 2000).

Other versions of OSES were developed and validated across the aviation, aerospace, energy, and healthcare industries (Ciavarelli 2012; Ciavarelli, 2007; Ciavarelli and Crowson 2004). The OSES capitalizes on the evolution and improvement of the survey content and application process gained from multiple applications across different industries and government agencies. An important part of the OSES development and validation was the NASA sponsored *NASA Survey Improvements Study* conducted by Ciavarelli 2012. That study included a review of current literature related to High Reliability Organizational Theory (Lekka, 2011) in addition to the statistical validation testing. Completion of the NASA sponsored survey improvement study allowed us to enhance the technical merits of the survey and to revise the survey in such a way that it is easier to administer online and to use the results as important employee feedback for managing safety risk and improving safety processes.

High Reliability Organizational (HRO) Conceptual Foundation for OSES[2]

The concept of the High Reliability Organizations (HRO) was created by social scientists and engineers like Roberts and Bea (2001) and Weick (1999). HRO was brought to broader exposure in a book published by Karl Weick and Kathleen Sutcliffe in 2007 entitled "Managing the Unexpected." The basic concept of HRO is that there are some organizations that function very effectively and safely because their leadership and organizational management are able to control risks in spite of having to operate in a very hazardous environment. HRO specialists often mention the U.S. Navy – particularly Naval Aviation operating on Aircraft Carriers – as an exemplary HRO organization (Roberts, Rousseau, and La Porte, 1994). HRO advocates also mention the nuclear industry, commercial aviation and air traffic control as organizations that operate in a highly reliable way (Roberts, 1993). There are different views regarding which attributes organizations must have in order to function as an HRO. Some of the more common attributes considered by Bea and Roberts (2001) and Weick and Sutcliffe (2007) include: (1) clear leadership commitment to safety, (2) intense attention to potential failures, (3) a non-punitive safety reporting culture

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[2] Adapted from Ciavarelli 2016, pp. 5-7.

(4) allowing critical risk decisions to be made by the most qualified people, which is accomplished by pushing operational risk decisions down to the front line.

Safety Culture.

Included in the concept of a high-reliability organization are factors related to the underlying safety culture of the organization. The safety culture is defined as the shared values, beliefs, assumptions, and norms which may govern organizational risk decision making, as well as individual and group attitudes about danger, safety, and the proper conduct of hazardous operations. Culture is passed on to successive generations of an organization's members. Culture molds behavior of individuals through a system of rewards, expectations about status, power and authority relations. Culture helps to establish group boundaries for inclusion or exclusion and creates underlying concepts for managing behavioral deviations. Culture is strongly influenced by the organization's structure and leadership (Schein, 1996, 1990).

James Reason, a well-known organizational safety scientist, succinctly defines the components of organizational culture, as follows:

> **Shared Values** *(What is important)* and **Beliefs** *(How things work)* that interact with an organizations structures and control systems to produce **Behavioral Norms** *(The way things work around here)*. (Reason 1997, p.192)

The safety culture focuses on issues regarding what is and what is not believed to be safe, and the accepted values and norms of safe behavior. The safety culture underlies what attitudes and behaviors are rewarded and what attitudes and behaviors are punished or corrected.

Just Culture

The term "just culture" refers to the principles for achieving a culture in which frontline personnel feel comfortable disclosing error, including their own errors - while maintaining professional accountability.

A "just culture" recognizes that individual workers should not be held accountable for system failings over which they have no control *(*AHRQ, 2008). Some of the key points of a "strong" and "just" safety culture are listed below:

- Shared values about what is safe and unsafe
- Common beliefs about how to conduct safe operations
- Open Reporting – "just culture" advocacy
- Behavioral norms that govern risk-taking, everyday procedures and precautions
- Transmission of values, beliefs and accepted practices to others

OSES Measurement Framework

The OSES Measurement Framework was developed by Ciavarelli (2012), based upon the HRO and safety culture literature cited earlier, as well as extensive Psychometric testing, and inputs from NASA aviation experts. Table 1 shows the resulting framework. (Next Page)

**Table 1: Organizational Safety Effectiveness Assessment Framework
(Aviation)**

ASSESSMENT AREAS (FACTORS)	SAMPLE SURVEY ITEMS
Safety Climate – Culture - SCC	• All employees feel free to report errors without fear of management reprisal.
Safety Supervision /Management- SSM	• I know who is responsible and accountable for safety in my work area.
Organizational Effectiveness - ORG	• I believe that morale is high at my work location/Base.
Safety Information Management - SIM	• I get all the information that I need to perform my job safely.
Workload/Fatigue Management - WFM	• I seldom feel overburdened by my daily work assignments
Maintenance Specific - MAINT	• My Work Location/Base has a sufficient supply of qualified maintenance personnel.

Each Measurement Area defined below, has several appropriate survey items that address the specific areas related to a given measurement area.

- *Safety Climate – Culture* -- Employees share common beliefs and values about safety, reliably follow best practices, and are able to report safety concerns without fear of reprisal.

- *Safety Supervision/ Management* -- Safety personnel establish a robust safety management framework, including safety policy and procedures that guide daily operations, and encourage safety awareness and hazard reporting. Leadership communicates safety goals and policies and promotes active safety participation. Supervisors lead by example.

- *Organizational Factors* -- Leadership sets policies, provides adequate safety resources, effectively manages change, and promotes open reporting of safety issues.

- *Safety Information Management* -- Safety personnel ensure that employees get updated and relevant safety critical information.

- *Workload and Fatigue Management* -- Supervisors provide adequate staff levels and control daily work routines to manage employee rest periods, workload and fatigue.

- *Maintenance Specific* -- Maintenance operations work "by the book", by following standard procedures. Managers oversee training, inspections and shift work practices.

Survey Instrument

Selected survey items form the Organizational Safety Effectiveness Survey (OSES) are included on page 8-9 of this document for the reader to review a sample of survey questionnaire items.

Human Factors Associates, Inc. works closely with its clients to adapt the core survey items to match the client safety and operational work environment, to address client specific issues, and to incorporate a terminology and vocabulary familiar to the client's employees.

It is important to understand the OSES is typically administered online. The online system provides a "user friendly" survey taker interface, and includes a password protected web interface for presenting timely graphic statistical summaries of survey results. However, the overall assessment process includes systematic employee interviews, focus groups, and safety document view in order to obtain an accurate and precise understanding of safety culture.

A demonstration version of OSES is available at the following link.

https://www.hfa-clients.com/hfademo/login.html

The OSES includes Likert Style ratings (1-5 Agreement Scale) and open - ended survey taker comment questionnaire items. The OSES uses a five – point Rating Scale defined as, Strongly Disagree = 1, Agree= 2, Neutral = 3, Agree = 4, Strongly Agree = 5. All survey items are presented as positive safety or mission operational performance topics. The following screen shot sample questionnaire items are taken from the web - based OSES.

Example of "Likert style" rating item.

SECTION I: Items (12 questions)	1- 5-point rating scale

1 | **I believe our Center has an effective safety reporting process.**

○ Strongly Disagree	○ Disagree	○ Neutral	○ Agree	○ Strongly Agree	○ Not Applicable
					○ Don't Know

2 | **My Supervisor is actively involved in the Center's safety program.**

○ Strongly Disagree	○ Disagree	○ Neutral	○ Agree	○ Strongly Agree	○ Not Applicable
					○ Don't Know

Example of open ended item

SECTION II: Open Ended (3 questions)

1. | **In your view, what situation or specific hazards or other factors may lead to an accident?**

[text entry box]

2. | **In your view, what are the most important safety actions that the company can take to reduce the chances of an accident?**

The OSES Web Survey software platform provides immediate online feedback of survey results, using diagnostic statistical summary charts of the types shown below:

Chart 1: Online Statistical Summary Graphs for Overall Survey Results

Print This Page

Show Item:	Show All	Show Critical	Outside 1 STD	Outside 2 STD	Open Ended Responses

My Case (ID 22): 5 of 15 surveys have been completed.

	SD	D̂	N̂	Â	SÂ
	0%	0%	5%	19%	76%

68.48%

The average rating for this unit on this survey is **at, or near** the average rating for OSES Air Medical Services

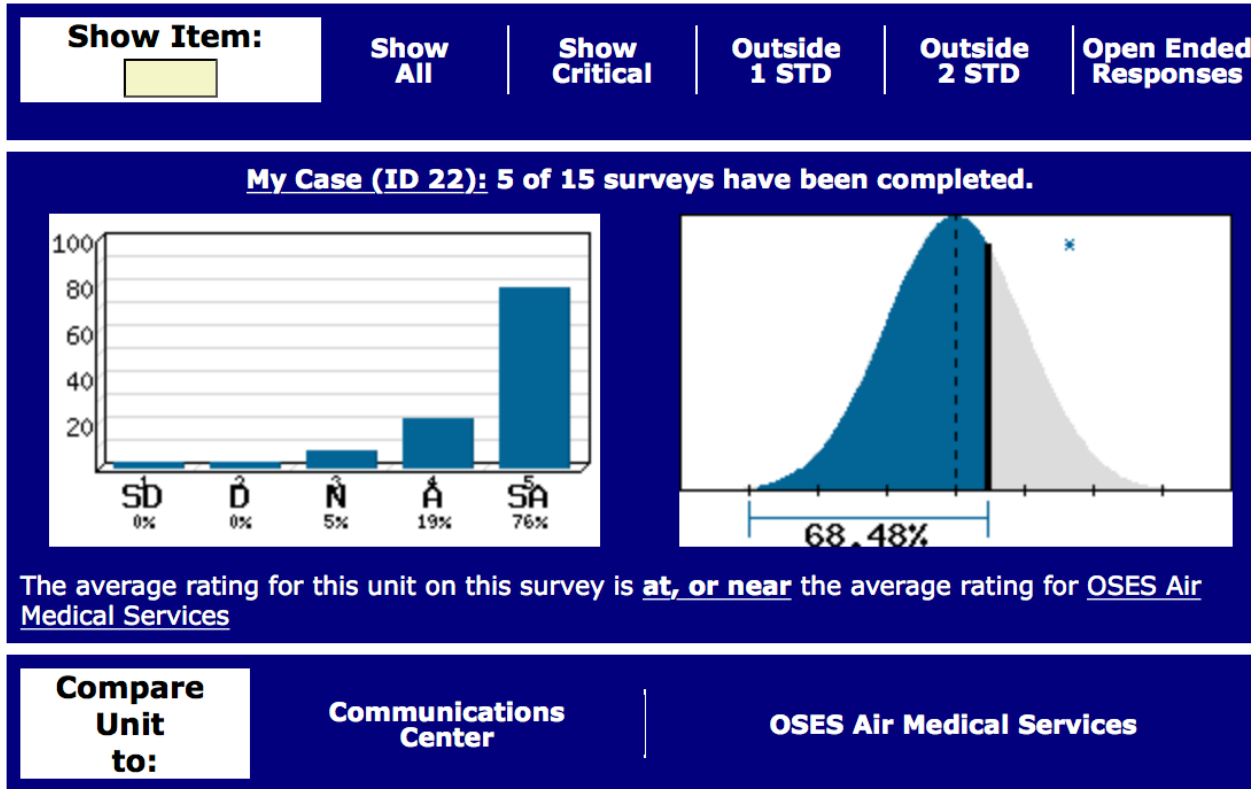| Compare Unit to:	Communications Center	OSES Air Medical Services

CHART 1: Left Side shows Relative Percentage of ratings across 5-point Scale. Right Side shows average and position of rating average on Normal Distribution for this Center, as measured against the company average taken across all survey items, company divisions and employees.

**Chart 2: Online Statistical Summary Graphs for Selected Survey Item
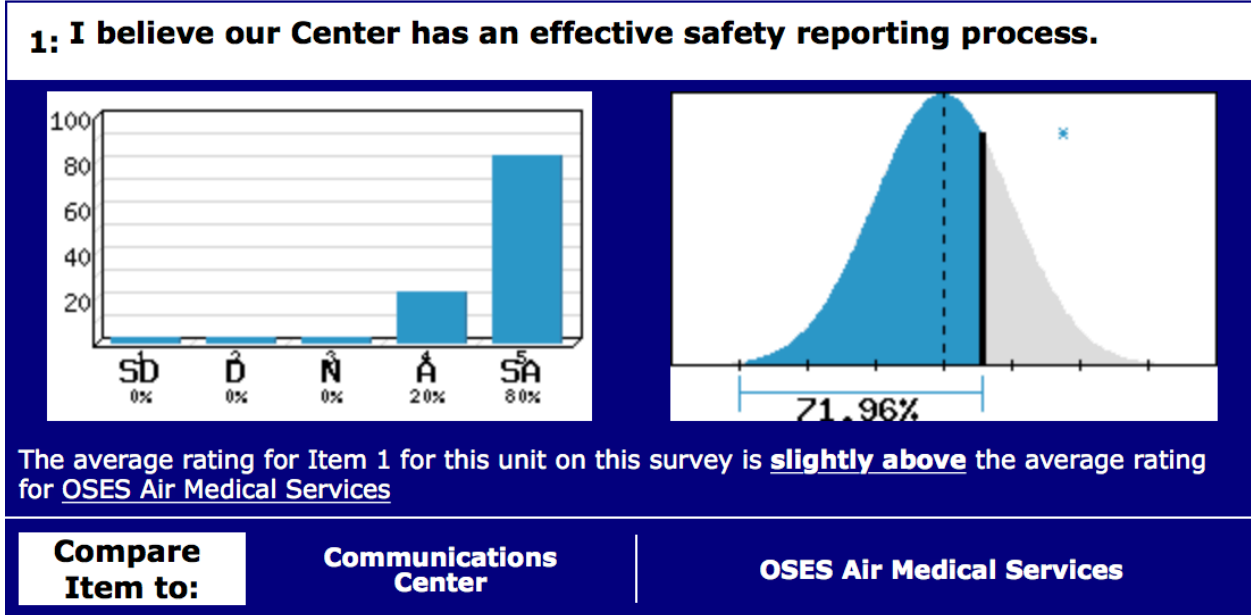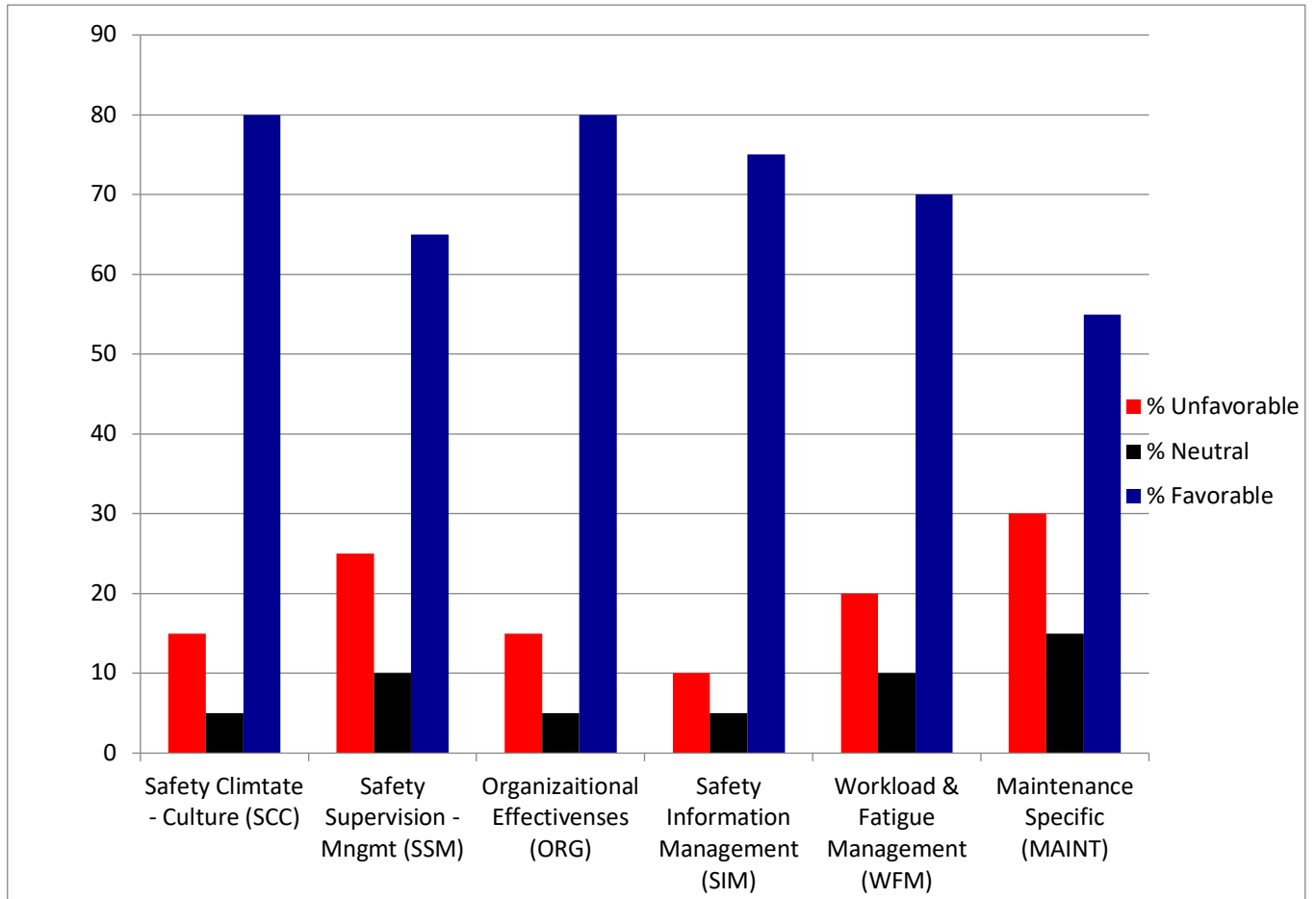(Fictitious Data)**

CHART 2 Survey Item 1 Results: Left Side shows Relative Percentage of ratings across 5-point Scale. Right Side shows average and position of rating average on Normal Distribution for Survey Item #1.
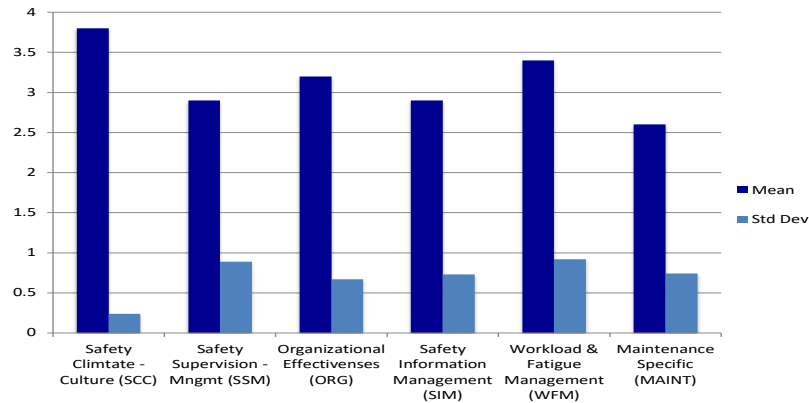
Analysis of Results

The OSES software platform includes a Research Module that allows easy downloading of all data, ratings and comments to an Excel Worksheet for more detailed statistical analysis. Data can be grouped by Measurement Area using OSES Factor Categories determined from Factor Analysis (Ciavarelli 2012).

The following charts show summary statistics computed from data downloaded using the Research Module download feature. Results are compared for each of. The selected OSES factors, or areas of measurement interest.

Sample OSES Results Chart:
Fictitious Data: Results by OSES Factor
Favorability Percentages

Bar chart of Favorability Percentages by OSES Factor. Legend: ■ % Unfavorable (red), ■ % Neutral (black), ■ % Favorable (blue).

OSES Factor	% Unfavorable	% Neutral	% Favorable
Safety Climtate - Culture (SCC)	15	5	80
Safety Supervision - Mngmt (SSM)	25	10	65
Organizaitional Effectivenses (ORG)	15	5	80
Safety Information Management (SIM)	10	5	75
Workload & Fatigue Management (WFM)	20	10	70
Maintenance Specific (MAINT)	30	15	55

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Sample OSES Results Chart:
Fictitious Data: Results by OSES Factor
Means and Standard Deviations

Survey Application Process

The OSES was developed and validated, using Factor Analysis and Reliability Testing to arrive a 48-rating survey item pool, categorized into six orthogonal Factors, Safety Climate-Culture, Safety Management, Organizational Effectiveness, Safety Information Management, Workload and Fatigue Management, and Maintenance Specific (Ciavarelli, 2012). These categories are defined on page three. Human Factors Associates, works with clients (who may represent different domains outside of aviation) to adapt the core validated HRO generic survey items, by appropriate editing, deletions and additions in order to tailor the survey for a particular domain application. Here are the steps taken to arrive at a useable, yet reliable and valid survey application.

1.HFA representatives gather safety documentation and conduct interviews and focus group discussions with a cross section of company/agency employees.
2.HFA constructs tailored survey based on the use of previously validated survey items and inputs from document review and personnel interviews.
3.A draft survey is presented to safety personnel for review and revision, then finalized for survey application.
4.The final survey client inputs and demographic information are uploaded to the web or a scanable paper version is created.
5.The survey is administered in accordance with preplanned schedule of events, including announcements/survey instructions, survey distribution, collection and analysis of survey data, and results reporting.
6. Results, including Normative Benchmarks, are presented along with recommendations for safety improvement interventions when warranted.
7. A time frame is established for a follow on second survey round that will provide results to be compared to the original "benchmark" Survey.

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ORGANIZATIONAL SAFETY EFFECTIVENESS SURVEY (OSES)

SAMPLE OF SURVEY ITEMS FOR AVIATION[3]

Likert Style Rating Items (1 – 5 Scale)

Safety Climate and Culture (SCC)

1. I believe that all employees strive to accomplish our operations in the safest possible manner.
2. I believe that the Company has a trustworthy non-punitive safety reporting process.
3. My work location/base provides clear procedures for preventing personal injury.
4. I believe that the Company provides my work location/base with adequate resources to support safe operations.
5. Managers at my work location/base are actively involved in the Company safety program.
6. Working safely is an integral part of all operations at my work location/base.
7. There is genuine commitment to safe work practices at my work location/base.

Safety Supervision - Management (SSM)

8. The Company regularly conducts thorough safety audits.
9. Local management has a clear picture of the risks involved in operations.
10. I believe that the Company has a very useful risk management process.
11. Safety personnel are influential in promoting safety at my work location/base.
12. My work location/base has an effective method for updating and correcting procedures
13. My organization is willing to make needed changes when it receives data or results that indicate a particular operation or situation is not working as well as intended.

Organizational Effectiveness (ORG)

14. My Supervisor recognizes workers (me) for their (my) high-quality performance.
15. My Supervisor can be relied upon to keep his/her word.
16. I believe that employee morale at my work location/base is high.
17. Company executives can be trusted to keep their promises to all employees.
18. Company management has adequately prepared all employees for ongoing changes to our business operations and organizational structure.
19. Good communications flow exists up and down the Company's chain of command.

Safety Information Management (SIM)

20. I have received specific training related to the high-risk elements of my job.
21. Submission of a safety concern is acknowledged in a timely manner.
22. Feedback is provided to the person who reported a safety concern regarding what actions are planned or taken.

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23. People at my work location/base willingly provide advice to each other concerning safety matters.
24. Our safety reporting system is easy to use.

Workload and Fatigue Management (WFM)

25. I seldom feel overburdened by my daily work assignments.
26. I do NOT have a problem staying alert on the job.
27. I am confident that I can complete all of my work within my normal shift period.
28. I believe that we have a sufficient number of personnel for our current operational tempo.

Maintenance Specific Survey Items (MAIN)

29. The "signing off" for any completed maintenance or repair job is done with absolute integrity.
30. An adequate hand-over is accomplished for any rotation of maintenance personnel so that job requirements and safety issues are effectively covered.
31. Management of maintenance operations provides effective leadership and oversight of maintenance work.
32. Maintenance management encourages us to work by the book.

OSES Open – Ended Survey Items

1. The most significant safety hazards that could lead to an accident, or a failure to properly manage safety at my work location/base are:

2. In your view, what are the most significant safety actions that my work location/base management can take to reduce that chance of an accident?

3. What aspects of Company policies, procedures or protocols do you think have had a positive impact on safety?

4. What aspects of Company policies, procedures, or protocols do you think have had a negative impact on the safety?

5. What additional training would help you perform your job more effectively?

6. Is there anything else that you think is an important safety matter or culture issue that was not addressed in this survey?