Communication as an Aspect of Safety Culture

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• Supported by FAA and Industry Partners

• Project Goals
  – To Build Industry-level Knowledge About Safety Program Effectiveness and Cultural Change
  – On-Going Fellowship Program with Industry Representatives
National Center for Aviation Safety Research

• Current Projects
  – Safety Culture Assessment & Change
  – Business Case Studies for SMS
    • Argument for making the SMS case
  – Part 141 SMS
  – Next Gen Aircraft Maintenance Engineer
National Center for Aviation Safety Research

• Current Projects
  – Maintenance ASAP
    • Examining how organizations disseminate and verify data obtained from ASAP reports and investigations
    • Identifying the most effective mechanisms for communicating lessons learned back to the workgroups
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• Current Projects
  – Maintenance ASAP

• Cross-over lessons learned from other High Consequence Organizations
  – Medical ASAP
  – Nuclear ASAP
  – Petro ASAP
  – Chemical ASAP
How to Assess Safety Culture?

- **Assessment Methods**
  - Case Analysis
    - Successful recoveries, undesirable events, incidents, and accidents
  - Survey Analysis
    - Attitudes and opinions questionnaires
  - Qualitative Analysis
    - Field observations
    - Artifact analysis
    - Interviews and focus group discussions
    - Dialog
  - Quasi-Experimental Analysis

- **Results**
  - Retrospective Findings
    - Linking human, organizational, and technical factors with safety outcomes
  - “Snap-shot” view of attitudes and opinions toward safety
  - Safety Culture Type
    - Description of existing safety policies, procedures, and practices
    - Stories of past safety successes and failures
    - Understanding of group dynamics
    - Surfacing underlying values and unquestioned assumptions
  - Establishing an intervention’s causal effect
What Type of Safety Culture Do We Have?

Safety Culture Transformation

Secretive  Blame  Reporting  Just

How Do We Transition Toward a Just Culture?
Organizational Communication

• A Single Aspect of Organizational Safety Culture
  – The unfettered transmission or exchange of information, knowledge, or ideas… (Oxford)
Communication

- Analysis of Attitudes & Opinions Regarding Communication Yields Clues Surrounding Behavior
The Analysis

• Participants
  – Air Carrier Partners
  – Air Cargo Partners
  – MRO Partners

n = 3,983 Cases
Data Analysis

• The Organizational Safety Culture Survey consist of statements requiring ordinal answers (level of agreement) accomplished with a Likert-type Scale.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

• A factor with an average score of 1.0 would indicate strong disagreement with the statement

• A factor with an average score of 5.0 would indicate strong agreement with the statement
Key Analysis

• Professional Criticism
  – The ability to peer critique or coach

• The Level of Trust/Respect Between Mechanic and Supervisor
  – Do we work in a learning organization (Is change possible)
Key Analysis

• Perception that Information Will be Carried Up the Organizational Change
  – Do we work in a learning organization (Do we leverage the knowledge & experience of the line)

• The Level of Trust Between Coworkers
  – Are we organizationally centric (Is everyone watching out for each other?)
Professional Criticism

• Is Criticism Good?
• The Manner of the Criticism is Important
  – If we wish to leverage collective experience
• Good Faith/Professional Criticism Makes Us Better
Professional Criticism

• Example Construct Determinants
  – Maintenance personnel should avoid disagreeing with one another
  – It is important to avoid negative comments about the procedures and techniques of other team members.

– Negative Coding
  • We would prefer to see disagreement with these statements
Professional Criticism

Criticism Should Be Avoided

- Mean Score: 2.9824
- Standard Deviation: 1.055
- n: 3,943
- Missing: 48
Criticism

• One-Way Analysis of Variance (ANOVA) Was Conducted Indicating a Significant Difference Between Air Carrier and MRO. No Significant Difference Exist Between Cargo Operators and Both Air Carriers and MRO’s

Omnibus Model F (2, 3940) = 7.395, $p < 0.05$

* It should be noted the assumption of equal group size was violated
### Avoid Criticism

<table>
<thead>
<tr>
<th></th>
<th>MRO</th>
<th>Cargo</th>
<th>Air Carrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Score:</td>
<td>3.12</td>
<td>3.04</td>
<td>2.95</td>
</tr>
<tr>
<td>Standard Deviation:</td>
<td>1.117</td>
<td>0.665</td>
<td>1.052</td>
</tr>
</tbody>
</table>

Criticism

• Narratives
  • We get chastised by the leads for finding problems that are not on our work cards
  • Performance reviews contain minimal safety information
  • There are no repercussions to violating safety rules
  • If someone is working, people don’t want to bother you
Supervisor Trust/Respect

- Management/Supervisor Trust
- The Literature Demonstrates Increased Productivity with Higher Levels of Trust
- Improved Trust Equates to Improved Productivity
Supervisor Trust/Respect

• Example Construct Determinants
  – My supervisor can be trusted
  – My immediate supervisor brings out the best in me
  – My supervisor protects confidential or sensitive information
  – My suggestions about safety would be acted upon if I expressed them to my supervisor
Supervisor Trust/Respect

I Trust/Respect My Supervisor

• Mean Score 3.3437


• Standard Deviation 0.97769

• n 3,974

• Missing 17
Supervisor Trust/Criticism

- One-Way Analysis of Variance (ANOVA) was conducted indicating a significant difference between Cargo Operators and both Air Carrier and MRO’s. Air Carrier and MRO’s were not significantly different.

\[ \text{Omnibus Model F (2, 3971) = 64.503, } p < 0.05 \]

* It should be noted the assumption of equal group size was violated
Across Industry

<table>
<thead>
<tr>
<th>Supervisor Trust/Respect</th>
<th>MRO</th>
<th>Cargo</th>
<th>Air Carrier</th>
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</thead>
<tbody>
<tr>
<td>Mean Score:</td>
<td>3.38</td>
<td>4.29</td>
<td>3.30</td>
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<tr>
<td>Standard Deviation:</td>
<td>0.870</td>
<td>0.833</td>
<td>0.986</td>
</tr>
</tbody>
</table>

Supervisor Trust/Respect

• Narratives
  • Can’t trust management with confidential information
  • I feel some distrust towards the management
  • There is no trust between company and employee
  • Management will constantly do what’s right
  • Middle management is often unqualified
  • Most first level supervisors are supportive
Vertical Communication

• The Literature Supports the Premise Information is Effectively Communicated from Supervision to the Line

• The Effectiveness of Communication from the Line to Various Levels of Supervision is Less Clear

• Valuable Safety Information may be Available from the Line
Vertical Communication

• Example Construct Determinants
  – Mechanics ideas are carried up the line
  – Within my organization, good communication flow exists up and down the organizational chain of command
  – My suggestions about safety would be acted on; if I expressed them to my lead or supervisor
Vertical Communication

Communication Flows Upward

• Mean Score 2.933


• Standard Deviation 1.0621

• n 3,969

• Missing 22
Vertical Communication

[Bar chart showing the distribution of responses for different degrees of agreement or disagreement.

- Strongly Disagree
- Slightly Disagree
- Neutral
- Slightly Agree
- Strongly Agree]
Vertical Communication

- One-Way Analysis of Variance (ANOVA) Was Conducted Indicating a Significant Difference Between Air Carrier, MRO and Cargo Operators

Omnibus Model $F (2, 3966) = 37.486, \ p < 0.001$

* It should be noted the assumption of equal group size was violated
### Across Industry

#### Vertical Communication

<table>
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<tr>
<td>Mean Score</td>
<td>2.74</td>
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<td>2.96</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.1.195</td>
<td>0.1.216</td>
<td>1.009</td>
</tr>
</tbody>
</table>

1. Strongly Disagree  
2. Slightly Disagree  
3. Neutral  
4. Slightly Agree  
5. Strongly Agree
Vertical Communication

• Narratives
  • The leads will get mad at you if you go to an inspector when the lead can’t help you with something
  • We have a suggestion box to address inconsistent or poorly written work cards
  • Mechanics don’t feel an open door policy exists with management
  • We only have one directional communication—from the top down
  • We feel good about our ability to communicate upward
  • Information is not always communicated back to the floor
Coworker Trust

• A Robust Safety Culture Presupposes a Significant Level of Trust Between Coworkers
• Coworker Trust May be Leveraged to Enhance safety (Peer Coaching)
• Higher Levels of Trust in the Workplace Improve Quality of Life
Coworker Trust

- Example Construct Determinants
  - Having the trust and confidence of my coworkers is important
  - Most of my coworkers can be relied on to do what they say they will do
  - The people I work with are helpful and supportive
  - The people I work with express interest in and concern for my well being
Coworker Trust

I Trust/Respect My Coworkers

• Mean Score 4.300


• Standard Deviation 0.654
• N 3,973
• Missing 18
Coworker Trust

![Bar chart showing coworker trust levels: Strongly Disagree, Slightly Disagree, Neutral, Slightly Agree, Strongly Agree. The chart indicates a significant increase in support from neutral to strongly agree.]
Coworker Trust

• One-Way Analysis of Variance (ANOVA) Was Conducted Indicating a Significant Difference Between MRO and Both Cargo Operators and Air Carriers. The Difference Between Air Carrier and Cargo Was Not Significant.

Omnibus Model  $F (2, 3970) = 46.562, \ p < 0.001$

* It should be noted the assumption of equal group size was violated
## Across Industry

### Vertical Communication

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<tr>
<td>Mean Score:</td>
<td>3.97</td>
<td>4.46</td>
<td>4.36</td>
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<tr>
<td>Standard Deviation:</td>
<td>0.613</td>
<td>0.577</td>
<td>0.645</td>
</tr>
</tbody>
</table>

1. Strongly Disagree  
2. Slightly Disagree  
3. Neutral  
4. Slightly Agree  
5. Strongly Agree
Coworker Trust

• Narratives
  • Some people ‘throw their trainees to the wolves’ because they don’t want them to succeed
  • You have to watch out for yourself here
  • I would not share my cell phone number with work people
  • People watch out for each other on the line
  • We used to be a family, it’s not a family anymore
  • There is a strong “buddy system” in this airline
## Descriptives

<table>
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<tr>
<th></th>
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<th>Cargo Operator</th>
<th>Air Carrier</th>
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<tbody>
<tr>
<td>Tenure</td>
<td>3.5 Years</td>
<td>5.5 Years</td>
<td>17.5 Years</td>
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<tr>
<td>Age</td>
<td>42 Years</td>
<td>50 Years</td>
<td>52 Years</td>
</tr>
<tr>
<td>Military Exp.</td>
<td>0.5 Years</td>
<td>9.4 Years</td>
<td>3.04 Years</td>
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<tr>
<td>College</td>
<td>0.5 Years</td>
<td>2.0 Years</td>
<td>2.0 Years</td>
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