## TRANSPORTATION LEARNING NETWORK

A partnership with MDT•NDDOT•SDDOT•WYDOT and the Mountain-Plains Consortium Universities

Welcome!

#### Key Components & Validity in the Measurement of Safety Culture

Presented by:

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Our partners:



This material is subject to change at the discretion of the presenter. If there are changes, TLN will obtain a revised copy to be posted on the LMS for download after the presentation. Thank you.





Organization of Presentation

- What is safety culture?
- Why is safety culture important?
- How can we measure it?
- How validity is the measurement tool?
- What do we do with this information?
- How do we create safety culture?
- Next steps?



# Statement of the Problem

 The issue of safety culture as a key component in the maintained and facilitation of an acceptable world class safety record. Many examples of how lapses in safety culture of operations have contributed to major accidents have been described in the literature.



## What is safety culture?

- First mentioned in a report about Chernobyl
- The <u>Chernobyl disaster</u> highlighted the importance of safety culture and the effect of managerial and human factors on safety performance.<sup>[4][5]</sup>
- The term 'safety culture' was first used in INSAG's (1988) 'Summary Report on the Post-Accident Review Meeting on the Chernobyl Accident' where safety culture was described as:
  - "That assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance."



# Chernobyl

- After the accident, officials closed off the area within 30 kilometers (18 miles) of the plant, except for persons with official business at the plant and those people evaluating
- and dealing with the consequences of the accident and operating the undamaged reactors. The Soviet (and later on, Russian) government evacuated about 115,000 people
- from the most heavily contaminated areas in 1986, and another 220,000 people in subsequent years (Source: UNSCEAR 2008, pg. 53).
- Health Effects from the Accident
- The Chernobyl accident's severe radiation effects killed 28 of the site's 600 workers in the first four months after the event. Another 106 workers received high enough doses to cause acute radiation sickness. Two workers died within hours of the reactor explosion from non-radiological causes. Another 200,000 cleanup workers in 1986 and 1987 received doses of between 1 and 100 rem (The average annual radiation dose for a U.S. citizen is about .6 rem). Chernobyl cleanup activities eventually required about 600,000 workers, although only a small fraction of these workers were exposed to elevated levels of radiation. Government agencies continue to monitor cleanup and recovery workers' health. (UNSCEAR 2008, pg. 47, 58, 107, and 119)
- https://www.nrc.gov/reading-rm/doc-collections/factsheets/chernobyl-bg.html



#### Clapham junction

- On 12 December 1988, a crowded passenger train crashed into the rear of another train that had stopped at a signal, just south of <u>Clapham</u> <u>Junction railway station</u> in London, and subsequently sideswiped an empty train travelling in the opposite direction. A total of 35 people were killed in the collision, while 484 were injured.<sup>[1]</sup>
- The collision was the result of a signal failure caused by a wiring fault. New wiring had been installed, but the old wiring had been left in place and not adequately secured. An independent inquiry, chaired by <u>Anthony</u> <u>Hidden</u>, <u>QC</u>, found that the signalling technician responsible had not been told his working practices were wrong and his work had not been inspected by an independent person. He had also performed the work during his 13th consecutive week of seven-day workweeks. Critical of the <u>health and</u> safety culture within <u>British Rail</u> at the time,



#### **Recent Events**

#### Lac Megantic

- Canadian runaway oil train disaster blamed on 'weak safety culture,' poor oversight – Washington Post
- A derailment that involved 72 tank cars full of crude oil occurred July 6, 2013. (Paul Chiasson/Canadian Press via AP)
- "We now know why the situation developed over time," Tadros said. "It was a weak safety culture at MM&A, poor training of employees and tanker cars that didn't offer enough protection."
  - <u>https://en.wikipedia.org/wik</u> i/Lac-<u>M%C3%A9gantic\_rail\_disa</u> ster

#### Metro North

- Poor 'safety culture' blamed for train crashes
- Metro-North Railroad management failed to follow its own safety protocols, according to a National Transportation Safety Board investigation.

#### • WMATA

 NTSB Cites Track Circuit Failure and WMATA's Lack of a Safety Culture in 2009 Fatal Collision7/27/2010



## Boeing Safety Culture – 737 Max

- nternal messages and emails from Boeing paint a picture of a profitfocused management culture at the world's largest aircraft manufacturer, where pressure for short-term shareholder returns seems to have overwhelmed safety concerns.
- The compromise to safety intensified as deregulation became popular in Washington, D.C. The FAA budget was reduced, and much of the safety oversight was subcontracted to staff paid by Boeing.
- "The downside is someone can threaten your position at work," said Cole. "You play ball or else. The managers could tell you to keep your mouth shut or you lose your job."
- "I don't know how to fix these things ... it's systemic," one employee wrote. "It's culture. It's the fact that we have a senior leadership team that understands very little about the business and yet are driving us to certain objectives."
- Well, the system is broken right now," Blumenthal told *The Fifth Estate*, "because the FAA has to be changed in its culture. It has to end outsourcing, end a system that, in effect, puts the fox in charge of the henhouse and puts safety second, rather than first."
  - https://www.cbc.ca/news/business/boeing-fifth-estate-costs-safety-1.5426571





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## Organizational Culture

- Study of Culture Margaret Mead
- Person Environment Interaction Kurt Lewin
- Defined Organizational culture Edgar Schein
- Safety Culture James Reason

## Definitions of Corporate Culture

Definition	Author
'in its most basic form is an understanding of "the way we do things around here." Culture is the powerful yet ill-defined conceptual thinking within the organization that expresses organizational values, ideals, attitudes and beliefs.'	(Cunningham & Gresso, 1994)
'consists of "learned systems of meaning, communicated by means of natural language and other symbol systems, having representational, directive, and affective functions, and capable of creating cultural entities and particular senses of reality."'	(D'Andrade, 1996)
'the learned patterns of behavior and thought characteristic of a societal group.'	(Harris, 2004)
'We will restrict the term <i>culture</i> to an ideational system. Cultures in this sense comprise systems of shared ideas, systems of concepts and rules and meanings that underlie and are expressed in the ways that humans live. Culture, so defined, refers to what humans learn, not what they do and make.'	(Kessing & Strathern, 1998)
'the set of learned behaviors, beliefs, attitudes, values, and ideals that are characteristic of a particular society or population.'	(Ember & Ember, 2001)
'All aspects of human adaptation, including technology, traditions, language, and social roles. Culture is learned and transmitted from one generation to the next by nonbiological means.'	(Jurmain et al., 2000)





# Safety climate

# Safety climate

# Safety culture

# What is safety culture?

"how we do things around here"

# Definitions of Safety Culture

# **European Union - Definition**

 Safety culture refers to the interaction between the requirements of the Safety Management System, how people make sense of them, based on their attitudes, values and beliefs and what they actually do, as seen in decisions and behaviors. A positive safety culture is characterized by a collective commitment by leaders and individuals to always act safely, in particular when confronted with competing goals.





## UK Health & Safety Executive (1993)

• The product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety management.



## Other Definitions

- Barnes (2009)
  - (NRC) The values, attitudes, motivations and knowledge that affect the extent to which safety is emphasized over competing goals in decisions and behavior.
  - Guldenmund (2000)
    - Those aspects of the organizational culture which will impact on attitudes and behavior related to increasing or decreasing risk.



### Safety Subcultures

- Many definitions of safety culture (e.g. ASCNI, 1993) present a view of employees having a shared set of safety values and beliefs.
- Studies have found the presence of subcultures within an organization which suggest an absence of a cohesive safety culture.
- Subcultures are likely to develop when employees within the same organization experience different working conditions.
- Work groups within an organization are likely to view risk differently depending on the type of work they do.



## **USDOT Elements of Safety Culture**

- **1**. Leadership is Clearly Committed to Safety
- 2. Open and Effective Communication Exists Across the Organization
- 3. Employees Feel Personally Responsible for Safety
- 4. The Organization Practices Continuous Learning
- 5. The Work Environment is Safety Conscious
- 6. Reporting Systems are Clearly Defined and Not Used to Punish Employees
- 7. Decisions Demonstrate that Safety is Prioritized Over Competing Demands
- 8. Employees and the Organization Work to Foster Mutual Trust
- 9. The Organization Responds to Safety Concerns Fairly and Consistently
- **10.** Safety Efforts are Supported by Training and Resources
  - - From FRA DOT/FRA/OR-17/09 2017



# Factors Affecting Safety Culture

#### Factors Affecting Safety Culture





# Impact of Safety Culture



- Workplace calamities are often related to poor safety culture
- Safety culture is important because it has been shown to reduce the prevalence of workplace accidents.
- Companies with strong safety cultures are believed to be the most protected against unforeseen accidents.



## Types of Accidents

- Individual accidents occur when an individual commits an error independent of organizational influences. An example of this type of accident would be an employee who follows company prescribed procedures, but loses his balance and falls off a ladder (Sumwalt, 2012).
- **Organizational accidents**, on the other hand, "have multiple causes involving many people operating at different levels of their respective companies...[and] can have devastating effects on uninvolved populations, assets and the environment" (Reason, 1997, p. 1).
- "Organizational accidents arise from the concatenation of several contributing factors originating at many levels of the system" (Reason, 2004, p. ii29).



#### Research Data

- The relationship between safety climate and injury rates across industries: the need to adjust for injury hazards.
- Smith GS<sup>1</sup>, Huang YH, Ho M, Chen PY
- Previous studies have suggested that strong safety climates (shared perceptions of safe conducts at work) are associated with lower workplace-injury rates Based on 33 companies, we assessed its association with injury rates using three rate based injury measures (claims per 100 employees, claims per 100,000 h worked, and claims per 1 million US dollars payroll), which were derived from workers' compensation injury claims. Linear regression models were used to test the predictability of safety climate on injury rates, followed by controlling for differences in hazard across industries gauged by national industry-specific injury rates. In the unadjusted model, company level safety climate were negatively and significantly associated with injury rates.
  - <u>Accid Anal Prev.</u> 2006 May;38(3):556-62. Epub 2006 Jan 23.



## Zohar, Dov .Journal of Applied Psychology, Vol 85(4), Aug 2000, 587-596.

- Testing the effect of safety climate on micro-accidents in manufacturing jobs.
- Safety Climate perceptions significantly predicted accident records during the 5-month recording period that followed climate measurement.
- The study establishes an empirical link between safety climate perceptions and objective injury data.

Table 4			
Hierarchical	Ordinary	Least	Square:

Hierarchical Ordinary Least Squares Regression Model for Group-Level Microaccident Rate as Outcome Variable

Variable	β	$\Delta R^2$	
Step 1			
Subunit risk	0.03	.01	
Step 2			
Subunit risk	0.01		
Action	-0.47***		
Expectation	-0.45**	.16*	

\* p < .05. \*\* p < .01. \*\*\* p < .001.



- A group-level model of safety climate: Testing the effect of group climate on microaccidents in manufacturing jobs.
- Zohar, Dov
- Journal of Applied Psychology, Vol 85(4), Aug 2000, 587-596.
- ABSTRACT
- Safety Climate perceptions of supervisory safety practices, company policies and procedures. The study included 53 work groups in a single manufacturing company. Safety climate perceptions significantly predicted accident records during the 5month recording period that followed climate measurement, when the effects of group- and individual-level risk factors were controlled. The study establishes an empirical link between safety climate perceptions and objective injury data.

#### Table 1

Rotated Principal-Components Analysis Factor Structure of the Group Safety Climate Scale With Items Rearranged by Factor (N = 534)

Item	Factor 1: action	Factor 2: expectation
1. My supervisor says a good word whenever he sees a		
job done according to the safety rules.	0.738	0.095
<ol><li>My supervisor seriously considers any worker's</li></ol>		
suggestions for improving safety.	0.776	0.125
<ol><li>My supervisor approaches workers during work to</li></ol>		
discuss safety issues.	0.738	0.166
<ol> <li>My supervisor gets annoyed with any worker ignoring</li> </ol>		
safety rules, even minor rules.	0.605	0.180
<ol><li>My supervisor watches more often when a worker has</li></ol>		
violated some safety rule.	0.620	0.255
b. As long as there is no accident, my supervisor doesn't	0.077	0.070
care now the work is done (R).	0.077	0.676
to work factor, rother than by the rules (P)	0.286	0.672
My supervisor news loss attention to sefety problems	0.280	0.075
than most other supervisors in this company (R)	0.083	0.611
9. My supervisor only keeps track of major safety	01000	0.011
problems and overlooks routine problems (R).	0.271	0.642
0. As long as work remains on schedule, my		
supervisor doesn't care how this has been achieved (R).	0.099	0.493
Eigenvalue	2.623	2.091

Note. Items are translated from Hebrew. (R) = reversal of item scores.

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\* p < .05. \*\* p < .01. \*\*\* p < .001.



# We Need a metric to manage against

'You can't manage what you can't measure' - Drucker

- Summary of the development of instrument and initial reliability & validity statistics.
- Available online at:
- <u>http://www.du.edu/ncit</u>





# Gaps in the Literature

• Current measurement tools are dissimilar and do not adequately measure corporate safety culture.

•

- Current measurement tools are dissimilar and do not permit benchmarking and comparisons.
- Our tool/instrument proposes to address these issues by developing normative data from a variety of organizations.

Schein also proposes a framework for a company to assess its own culture rapidly.

- obtaining leadership commitment
- selecting groups for self assessment
- a short lecture on how to think about culture (with the 3 levels of culture)
- identifying artifacts (what is going on here)
- identify espoused values (why are we doing things our way ?)
- identify shared underlying assumptions
- identify cultural aids or hindrance
- decide on next steps

:



MEASURE	AUTHOR	WEAKNESS	EVIDENCE
Organizational Culture Inventory	Cooke & Lafferty	<ol> <li><u>Theory</u> (unknown)</li> <li><u>No statistical support</u></li> </ol>	Absent of any reliability or validity data
Denison Organizational Culture Survey	Denison & Neale	<ol> <li><u>Theory</u> (measures values, but no other aspect of culture)</li> <li><u>No statistical support</u></li> </ol>	Absent of any reliability or validity data
Safety Culture Survey	Safety Performance Solutions	1) <u>Theory</u> (measures climate)	Absent of any reliability or validity data
Safety Culture Values and Practices Questionnaire	Diaz-Cabrera, Hernandez-Fernaud, & Esla-Diaz	1) <u>Theory</u> (measures values, but no other aspect of culture)	Absent of any reliability or validity data
Safety Culture Indicator Scale Measurement System	Thaden & Gibbons	1) <u>Theory</u> (measures climate)	Alfa coefficients =.81- .95





Measurement of Corporate Safety Culture

# Other Measures – No Psychometrics Available

- UK HSE
- Multi-level Safety Climate Survey
- Safety Management Questionnaire

### A Perfect Measure

- A review of the literature does not uncover a complete or comprehensive measure of corporate culture or corporate safety culture.
- A perfect measure would include an evaluation of each global domain of culture.
  - meaning systems,
  - values/beliefs, and attitudes
  - behavioral expectations & practices





#### Proposed Model of Safety Culture



## Definitions

- <u>Meaning Systems:</u> Meaning Systems are underlying mental constructions that allow for the interpretation and understanding of how daily events fall into an individual's personal narrative.
- <u>Values/Beliefs:</u> Values represent the fundamental moral expectations that an individual uses to appraise daily events.
- <u>Behavioral Expectations:</u> Behavioral Expectations refers to the activities that are anticipated within the course of an individual's employment responsibilities.



## Measure Development

- Items are developed conceptually, following an attempt to create items within the three themes.
- Items from previously validated tests can be used and integrated into measure.
- Total of item pool of 70-100 items



# Our Efforts

- Colorado State Department of Transportation (CDOT N=1900).
  - 1) Participants did not hold managerial positions.
  - 2) Participants held high-risk jobs, (divisions of transit and rail, or maintenance).
- Cross-validation sample obtained from a Regional Heavy Rail Company N=600



#### Methodology



Index was administered to 1900+ CDOT employees



970 cases met participant criteria



Exploratory factor analysis was completed to discover latent factors.



Second data set obtained from a sample Of 600+ Employees from Large Regional Rail Company

# Three components





# Three components





# Assessment of Culture

- Culture Assessment
  - Takes place on three levels
    - Attitudes & Perceptions
      - Interviews and focus groups with key employees and use of survey questionnaires
    - Beliefs & Values
      - Review of written published materials as well as interviews, focus groups and survey questionnaires
    - Conduct & Behaviors
      - Observation of workplace activities and inspection of work place and equipment as well as use of survey questionnaires





# Assessment Methods

- Survey Questionnaire (online and paper and pencil)
- Interview Format and Questions
- Workplace Observation Audit Checklist
- Analysis of Initial Data and Explanatory Rep

#### Observation Guide

- Management
   Commitment
- Communication
- Employee Involvement
- Training & Information
- Motivation
- Compliance with procedures
- Learning organization





## Benefits of Safety Culture Assessment

- Leads to a more complete adoption of overall set of attitudes , beliefs
- Leads to a code of conduct
- Norms and ideas contained within a commonly shared culture will fill gaps and
- Leads to motivation to behavior
- Can show the failure of culture or a lax culture
- Suggests areas associated with lower numbers of accidents/incidents.



### Culture and Strategy

- In March 2011 the "Harvard Business Review" published with the title :
  - Culture Trumps Strategy, Every Time
- In 2014 the "Los Angeles Times" profiled the head of the L.A. Fire Department who ascribed the saying the Drucker: <sup>11</sup>
- "Culture eats strategy for lunch."







## Culture and Performance

- "We found that culture causes performance, not vice versa," says Michael Gillespie, one of the researchers and an assistant professor of psychology at the University of South Florida, Sarasota-Manatee.
- Companies that got good grades from employees on culture generally had higher profits in later years
- "The culture of a sales department right now is going to influence the customer satisfaction from that department two years from now, and that customer satisfaction is going to drive vehicle sales two years from that point," says Dr. Gillespie.
- -https://www.wsj.com/articles/the-relationship-between-corporateculture-and-performance-1456110320



# **CORPORATE CULTURE AND PROFITABILITY**

Impact of strategy-culture alignment on corporate profitability

Profit margin (%)

Culture not aligned with strategy	4.8	
Notsure	5.9	
Culture aligned with strategy	9.3	
Culture strongly aligned with strategy	11.5	

Source: Tata Strategic Management Group



# Culture and profitability

- More than three quarters (87 per cent) of industry leaders claim to plan their culture with their evolving business plans but many fail to achieve the alignment. Only 69 per cent of the respondents claimed alignment between their culture and business strategy. A third of the respondents admitted the culture existing in their organization was not something they had envisioned as a business leader.
- Firms in the automotive, engineering and metals sectors reported full alignment between their strategy and organizational culture. In comparison, more than half of the respondents in logistics, services (telecom, hospitality and consulting), and power and infrastructure sectors feel their culture is either weakly aligned or not aligned at all with their strategy.
  - by Tata Strategic Management Group.

TImpact of Strategy-Culture alignment on corporate profitability		
Profit Margin		
Culture not aligned with Strategy	4.8%	
Not Sure	5.9%	
Culture aligned with Srategy	9.3%	
Culture Strongly aligned with Strategy	11.5%	



#### Materials to be developed

#### **Assessment Tools**

- Survey Questionnaire (online and paper and pencil)
- Interview Format and Questions
- Workplace Observation Audit Checklist
- Analysis of Initial Data and Explanatory Rep

#### **Interpretation Guides**

- Guidelines for Administration
- Guidelines for Interpretation
- Guidelines for Changing the Culture
- Video for Explanation and Implementation (optional)



# Project Milestones SUGGESTED METHODS

The following main tasks will be undertaken.





# Key Methodology

#### **Conceptual Framework**

- Attitudes
- Behaviors
- Values
- Identify Sample items
- Identify Sample Practices
- Prototype Creation
- Validation
- Implementation

Implementation Team

- CEO and Safety Manager
- Steering Committee
- Implementation Team
- Data Managers



#### Relative Importance of Components of Culture Results of University of Denver research

- Management Commitment
- Personal Responsibility
- Peer Commitment
- Senior Mgmt Commitment
- Safety vs Productivity
- Education Training Focus
- Safety Knowledge
- Safety Rewards
- Accountability
- Safety Practices





# Comprehensive HSE Observation Guide

- Management Commitment
- Communication
- Employee Involvement
- Training & Information
- Motivation
- Compliance with procedures
- Learning organization





#### **Previous Research**



Comparison of Employees - Near Miss



# Comparison of Culture Elements





## Comparison of Departments or Subgroups





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#### Key Dimensions of Denver Safety Culture Tool

#### F1 – Management Commitment – Immediate Supervisor

- Assesses perceptions that supervisors are committed to safety as evidenced by the perception that they are encouraged to raise safety concerns and that supervisors are engaged in in and investing time in improving safety

#### F2 - Personal Responsibility

- Assesses perceptions that safety is a personal responsibility which can be can be prevented by personal actions.

#### F3 - Peer Commitment

- Assesses perceptions that co-workers are committed to personal safety contribute to making the workplace safe.

#### F4 – Management Commitment – SR

- Assesses perceptions that the degree to which employees feel that senior mgmt. and the corporation is committed to employee safety.

#### F5 – Safety vs Productivity

- Assesses perceptions that employees believe that safety is not sacrificed for productivity and that the work area has been made as safe as possible.

#### F6 – Education Focus

- Assesses perceptions regarding the extent to which the organization and the safety professionals have provided safety training and information to assist with emp safety.

#### F7 – Safety Knowledge

- This scale assesses the extent to which employees understand and know how to address risks and hazards in the work environment.

#### F8 – Safety Rewards – (Inc)

- Assesses perceptions regarding the believe that safe work behaviors are rewarded in the organization through promotions and performance ratings.

#### F9 – Accountability

- this scale assesses the extent to which employees believe that persons engaged in unsafe practices or work behaviors are held accountable for their actions.

#### F10 – Safety Practices

- Assesses the extent to which employees feel that they utilize personal protective equipment and safe work practices as encouraged to do so by their supervisors.







# Year 2 – Independent sample t-tests on Safe vs UnSafe behavior.

	U N ( N =	SAFE :128)	SAFE (N=123)	T (DF=249)	P< (2- TAILED)
Mgmt. Commitment-Immed	2.87		4.23	(4.89)	0.00
Personal Responsibility	4.13		4.58	(1.16)	0.25
Peer Commitment	3.45		4.22	(3.50)	0.00
Mgmt. Commitment – Sr	2.87		3.89	(3.99)	0.00
Safety vs Productivity	2.80		3.90	(3.22)	0.00
Education Focus	2.63		3.76	(5.20)	0.00
Safety Knowledge	3.93		4.46	(2.89)	0.00
Accountability	2.87		3.94	(3.55)	0.00
Rewards for Safety	3.03		3.73	(2.71)	0.01
Safety Practices	2.14		4.23	(10.82)	0.00
		NIVERSITY ENVER NCI	T Beyond g		

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#### Table 11. Comparison of Perceived Safety Culture between Year 1 and Year 2.

	Year 1 (N=447)	Year 2 (N=472)	t	df	Sig. (2- tailed)
Immed Sup - Commit	3.6	3.4	2.7	917	.007
Peer Commit	3.8	3.7	1.3	918	.203
Mgmt. Comm-SrMgr	3.4	3.3	2.1	921	.038
Personal Responsibility	4.3	4.2	2.7	907	.007
Safety vs Productivity	3.4	3.2	2.4	915	.017
Education Focus	3.2	3.3	-0.6	911	.531
Safety Knowledge	4.1	4.1	1.1	915	.272
Accountability	3.5	3.4	1.1	912	.255
Rewards for Safety	3.4	3.3	1.3	910	.185
Safety Practices	3.3	3.0	3.5	868	.000





#### Safety culture in transport

Source: TØI report 1012/2009

Figure S.2 Scores of the safety culture index distributed by transport mode.



## Leadership

- One of the most important components of safety culture is leadership. As an industry thought leader, DOT can significantly influence safety culture of the transportation industry. For example, by starting internally, DOT leaders can ensure that employees fully commit themselves to making safety their highest priority and be dedicated to safety in all aspects of their work. Fostering a strong safety culture within DOT is a first step in asking the same of those that it oversees, collaborates with, and regulates in the transportation industry. This usually begins with a policy statement on safety and safety culture (see Appendix B).
  - <u>file:///Users/patrick/Dropbox/Safety%20Culture/dot\_32538\_DS</u>
     <u>1.pdf</u>

# Developing a Leadership assessment matched with culture assessment

#### Leadership behaviors

- 1. Problem Solving
- 2. Emotional Competence
- 3. Results Orientation
- 4. Safety Leadership
- 5. Integrity .
- 6. MSFI Total

#### **Culture Elements**

- 1. Management Commitment
- 2. Personal Responsibility
- 3. Peer Commitment
- 4. Senior Mgmt Commitment
- 5. Safety vs Productivity
- 6. Education Training Focus
- 7. Safety Knowledge
- 8. Safety Rewards
- 9. Accountability
- **10.Safety Practices**



## Discussion

- Work continues factors and items related to behavioral targets.
- Improve reliability.
- Validate relationship to criterion.





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# Thank you!



http://www.leadershipsuccessfactors.com/safety/



#### TRANSPORTATION LEARNING NETWORK

A partnership with MDT•NDDOT•SDDOT•WYDOT and the Mountain-Plains Consortium Universities

Thank you for participating!

You will be automatically directed to a short survey, please take a moment to provide your feedback.

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https://tln.learnflex.net/ https://www.translearning.org/

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