Risk, Reward, and Risk Taking: Construction Workers’ Perspective

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Construction Safety

Rate of fatalities in construction, selected countries, 2013

Source: (CPWR, 2016)
State of Construction Safety

Number of nonfatal injuries resulting in days away from work in construction, 1992 to 2015. Source: (CPWR, 2016)

Number of fatalities in construction, 1992 to 2015. Source: (CPWR, 2016)
Root causes of construction accidents (Abdelhamid and Everett, 2000):
- Failure to identify hazards,
- Proceeding with hazardous activity after diagnosing its riskiness,
- Acting unsafely despite the worksite conditions.

Behavioral-related root causes of accidents (Gambatese et al, 2016):
- mistake/error,
- absent-minded/forgetful,
- uncaring/indifferent,
- ignorance,
- poor risk management, and
- high risk tolerance
Construction workers are at the forefront of accidents, and often the last point of contact in a safety system failure.
How often do you knowingly take a calculated risk even though it is against your training/work safety plan?

- Always: 120
- Most of the time: 80
- About half the time: 10
- Sometimes: 9
- Never: 11
How Are Decisions Made?

Situational Awareness Model (Endsley, 2015)
Figure from: Lahtinen, 2016
Intuitive feelings and experiences are still the predominant method by which human beings evaluate risk.

In simple terms, risk perception is defined as the personal evaluation of daily encountered hazards.
Risk Perception

Contractors plan, manage, and mitigate the residual safety risk passed down from the designer.

Construction is dynamic, Sites have varying conditions, and No task-specific quantifiable safety metric [1].

Therefore, construction relies on safety professionals' assessments, as well as workers’ perceptions and their assessment of risk.

Why use worker risk perception?

Worker risk perception is influenced by the same factors that affect their perception in their day-to-day work [1].

Workers are able to adequately assess the risk in their own work [2].

How?

- Self assessment (Likert scale)
- Self assessment (frequency * exposure)
- Hazard identification (using a picture of a scenario; Job Hazard Analysis)

**Hazard present:**
- Fall hazard
- Electrical hazard
- Struck by hazard

**Bad safety practices:**
- Incorrect ladder use
- No safety glasses

**Good safety practices:**
- Proper tool handling (using the tool bag)
• Construction workers do not act in an unsafe manner intentionally (Tixier et al., 2014).

• Research shows that preconceptions in risk perception cause risk misjudgments which in turn might cause unsafe conduct (Arezes and Miguel, 2008).

• The problem lies in a common misconception that the higher an individual’s level of competency in risk perception, the more likely they will work in a safe manner.

• However, research indicates that being aware of the risk associated with one’s work does not necessarily mean that he/she will adopt safe practices in their work (Mullen, 2004).

• Mullen (2004) noted that employees often weigh the negative aspects of their jobs against the positive aspects.
An occupational reward can be anything of value (tangible or intangible) that an employer or an organization delivers to its employees whether intentionally or unintentionally in contemplation of the employee’s work contributions and to which employees as individuals attach a positive value as a satisfier of certain self-defined needs” (Shields et al., 2016).
Rewards

- Not all rewards are created equal!
# Rewards

## Relationship of Total Reward Approach to Maslow and Herzberg Models

<table>
<thead>
<tr>
<th>Total Reward Approach</th>
<th>Maslow’s Motivation Theory</th>
<th>Herzberg’s Two-Factor Model</th>
<th>Expected Outcome with respect to Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base pay</td>
<td>Physiological Need</td>
<td>Hygiene Factor</td>
<td>Attract</td>
</tr>
<tr>
<td>Cash benefits</td>
<td>Safety Need</td>
<td>Hygiene Factor</td>
<td>Attract</td>
</tr>
<tr>
<td>Performance-related pay</td>
<td>Esteem Need</td>
<td>Motivator Factor</td>
<td>Attract, Retain</td>
</tr>
<tr>
<td>Learning and Development</td>
<td>Cognitive Need</td>
<td>Motivator Factor</td>
<td>Motivate</td>
</tr>
<tr>
<td>Succession planning</td>
<td>Safety Need</td>
<td>Motivator Factor</td>
<td>Retain and Motivate</td>
</tr>
<tr>
<td>Career progression</td>
<td>Self-Actualization</td>
<td>Motivator Factor</td>
<td>Attract, Retain, and Motivate</td>
</tr>
<tr>
<td>Management culture</td>
<td>Belonging Need</td>
<td>Hygiene Factor</td>
<td>Attract, Retain</td>
</tr>
<tr>
<td>Performance support</td>
<td>Belonging Need</td>
<td>Hygiene Factor</td>
<td>Retain</td>
</tr>
<tr>
<td>Work group affinity</td>
<td>Belonging Need</td>
<td>Hygiene Factor</td>
<td>Retain, and Motivate</td>
</tr>
<tr>
<td>Work-life balance</td>
<td>Belonging Need</td>
<td>Hygiene Factor</td>
<td>Retain</td>
</tr>
<tr>
<td>Job challenge</td>
<td>Aesthetic Needs</td>
<td>Motivator Factor</td>
<td>Attract</td>
</tr>
<tr>
<td>Responsibility</td>
<td>Esteem Need</td>
<td>Motivator Factor</td>
<td>Attract</td>
</tr>
<tr>
<td>Autonomy</td>
<td>Aesthetic Need</td>
<td>Motivator Factor</td>
<td>Attract</td>
</tr>
<tr>
<td>Task verity</td>
<td>Aesthetic Need</td>
<td>Motivator Factor</td>
<td>Attract</td>
</tr>
</tbody>
</table>

(Hewitt, 2012; Kwon and Hein, 2013)
Rewards

- Kano Model

https://www.ashokcharan.com/
Risk is Half the Equation
In people’s minds, risk and rewards are **negatively** correlated.  
Curral et al. (2006)

In the real world, risk and reward are often **positively** correlated.  
Starr (1969)
Risk-Reward Trade-off: Background (Cont’d)

(Slovic, 2004)
Construction Safety Risk and Occupational Reward Trade-off
Data Collection

- Survey of over 200 construction workers, nationwide

Survey participation rate by state

- 37 interviews, 6 construction sites, 5 companies
Risk

Respondent assessment of their work safety risk

Safety Risk Assessment

- Very safe: 25
- Safe: 34
- Average safety risk: 85
- Risky: 43
- Very risky: 21
Rewards

Reward representation by category as indicated by respondents
Rewards

Reward importance as indicated by respondents
Stated Relationship

For safety risk and occupational reward, if we increase one, the other would:

- Remain the same: 67 responses
- Decrease: 68 responses
- Increase: 41 responses

Perceived relationship between risk and reward
## Risk-Reward Relationship

### Revealed Relationship

<table>
<thead>
<tr>
<th>Risk and Reward Perception Variable</th>
<th>Mean</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1: Worker’s knowledge of safety</td>
<td>2.06</td>
<td>1 = very high level of knowledge, 7 = very low level of knowledge</td>
</tr>
<tr>
<td>A2: Company’s knowledge of safety</td>
<td>2.00</td>
<td>1 = very high level of knowledge, 7 = very low level of knowledge</td>
</tr>
<tr>
<td>A3: Fear of accident</td>
<td>2.93</td>
<td>1 = very little fear, 7 = extreme fear</td>
</tr>
<tr>
<td>A4: Personal vulnerability</td>
<td>3.32</td>
<td>1 = extremely unlikely, 7 = extremely likely.</td>
</tr>
<tr>
<td>A5: Potential consequences</td>
<td>4.45</td>
<td>1 = low impact potential, 7 = very high impact</td>
</tr>
<tr>
<td>A6: Preventability of risk causing the accident</td>
<td>2.71</td>
<td>1 = extremely preventable, 7 = extremely unpreventable</td>
</tr>
<tr>
<td>A7: Possibility of worker intervention</td>
<td>2.93</td>
<td>1 = very high possibility, 7 = very low possibility</td>
</tr>
<tr>
<td>A8: Potential to impact a large number of workers</td>
<td>2.98</td>
<td>1 = very low level of impact, 7 = very high level of impact</td>
</tr>
<tr>
<td>A9: Long-term potential of risk</td>
<td>1.84</td>
<td>1, immediate impact, 7 after a very long time</td>
</tr>
<tr>
<td>Reward Perception</td>
<td>1.85</td>
<td>1 = very satisfied with reward, 7 = very dissatisfied with rewards</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>1.95</td>
<td>1 = very satisfied with my job, 7 = very dissatisfied with my job</td>
</tr>
</tbody>
</table>
Risk-Taking

[Diagram showing relationships between variables such as Accidents Involvement, Age, Risk Perception, Risk Comprehension, Projection, Risk-Reward Relationship, Reward Perception, Taking Risk for Reward, and Knowingly Take Risk.]

[Refer to the diagram for detailed relationships and coefficients between the variables.]
Decision Making

Will you work on a safe site if your benefits are low (not that high)?

Will you work on a hazardous site if your benefits are high (higher than what you normally work with)?

Do you have a preference regarding site conditions, and job benefits?

<table>
<thead>
<tr>
<th>Theme/Group (% of all 37 participants)</th>
<th>Theme Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (16.2%)</td>
<td>Safety is prioritized over reward</td>
</tr>
<tr>
<td>B (35.1%)</td>
<td>Working on a safe site with low benefits is not acceptable</td>
</tr>
<tr>
<td>C (24.3%)</td>
<td>High risk for high reward</td>
</tr>
<tr>
<td>D (10.8%)</td>
<td>Yes to all jobs, as long as I am paid</td>
</tr>
<tr>
<td>E (13.5%)</td>
<td>Safety is good, but a bit more risk is acceptable too</td>
</tr>
<tr>
<td>Reasons for Taking Risk</td>
<td>Freq. (%)</td>
</tr>
<tr>
<td>--------------------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Cut corners to get the job done</td>
<td>19/37 (51.5)</td>
</tr>
<tr>
<td>Every job have some risk, even if I don't take risk myself</td>
<td>10/37 (27%)</td>
</tr>
<tr>
<td>I don’t risk safety</td>
<td>5/37 (13.5%)</td>
</tr>
<tr>
<td>Other reasons</td>
<td>3/37 (8%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reasons for not Taking Risk</th>
<th>Freq. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>high consequences: possible injury/ outside of my comfort zone</td>
<td>10/37 (27%)</td>
</tr>
<tr>
<td>I value my life/getting back to my family/no reason to take risk</td>
<td>17/37 (46%)</td>
</tr>
<tr>
<td>Other workers safety, I can get fired, company policy, I find ways to do it safely</td>
<td>10/37 (27%)</td>
</tr>
</tbody>
</table>
Conclusions

- Construction workers do take risks in their jobs
- Risk perception is still widely used in construction safety assessment
- Risk perception is not secluded from rewards perception
- Workers have no understanding of the risk-reward relationship in their jobs
  - However, worker decisions are influenced by the risk-reward relationship
- Risk taking is not always related to personal tendencies
  - Normalization of deviance
  - Psychological contract
  - Risk-taking for other’s benefit (employer/client)
Path Forward

• Assessments of risk-taking, and risk-reward perception, are required

• Training for risk-reward implication, and risk homeostasis.
  • For example: Signing bonus, danger money, productivity bonus.

• Crew re-assignment (based on collective risk-taking balance)

• Is it risk-taking or decision-making under uncertainty?
References


