Behavioral Considerations for Proximity Warning Implementation

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Preview

- Background

- Methods

- Results

- Future Directions

Background

- Organizations & Social Influence
- Study focuses on the behavioral aspects of proximity warning systems
- Why is behavior an important aspect to include?
- How can we change behavior?

Attitude and Behavior Change

- Short-term

- Long-term

- Attitudes → Behavioral intentions → Behavior

- Being injured is undesirable *(attitude)*

- The proximity warning system will prevent me from being injured *(attitude)*

- I intend to use the system as I was trained *(behavioral intention)*

- When I go to work, I leave the system on and stand in a safe location *(behavior)*

Method

- Meet with CM Operators at mines which are testing proximity warning systems
    - Collect survey data
    - Conduct interviews
- Pre- and posttest design

Survey Design

- Health Belief Model (Rosenstock, 1974)
    - Perceived susceptibility
    - Perceived severity
    - Perceived barriers
    - Perceived benefits
- Operators responded on a scale of 1-5

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	2	3	4	5

Perceived Susceptibility

- Belief that they can be injured by a continuous mining machine

  – Continuous miner operators are more likely than others to be injured on the job.

  – It is likely that at some point I will be injured by my continuous miner.

Perceived Severity

- Belief that the consequences of injury are serious enough to try to avoid

  – If I were injured by my continuous miner, it would probably NOT be too serious.

  – Injuries from a continuous miner are usually not that bad.

Perceived Barriers

- Things to stop them from using the proximity warning system

  – A proximity device will be dangerous because it will force me to stand in a location where I can't operate it like I should.

  – Using a proximity warning device will decrease my productivity.

Perceived Benefits

- Reasons why it would be good to use the proximity warning system

    - I think it is a good idea to have safety devices to keep miners out of the danger zones next to continuous miners.

    - If I stand in a safe zone I am not at all likely to be injured by my continuous miner.
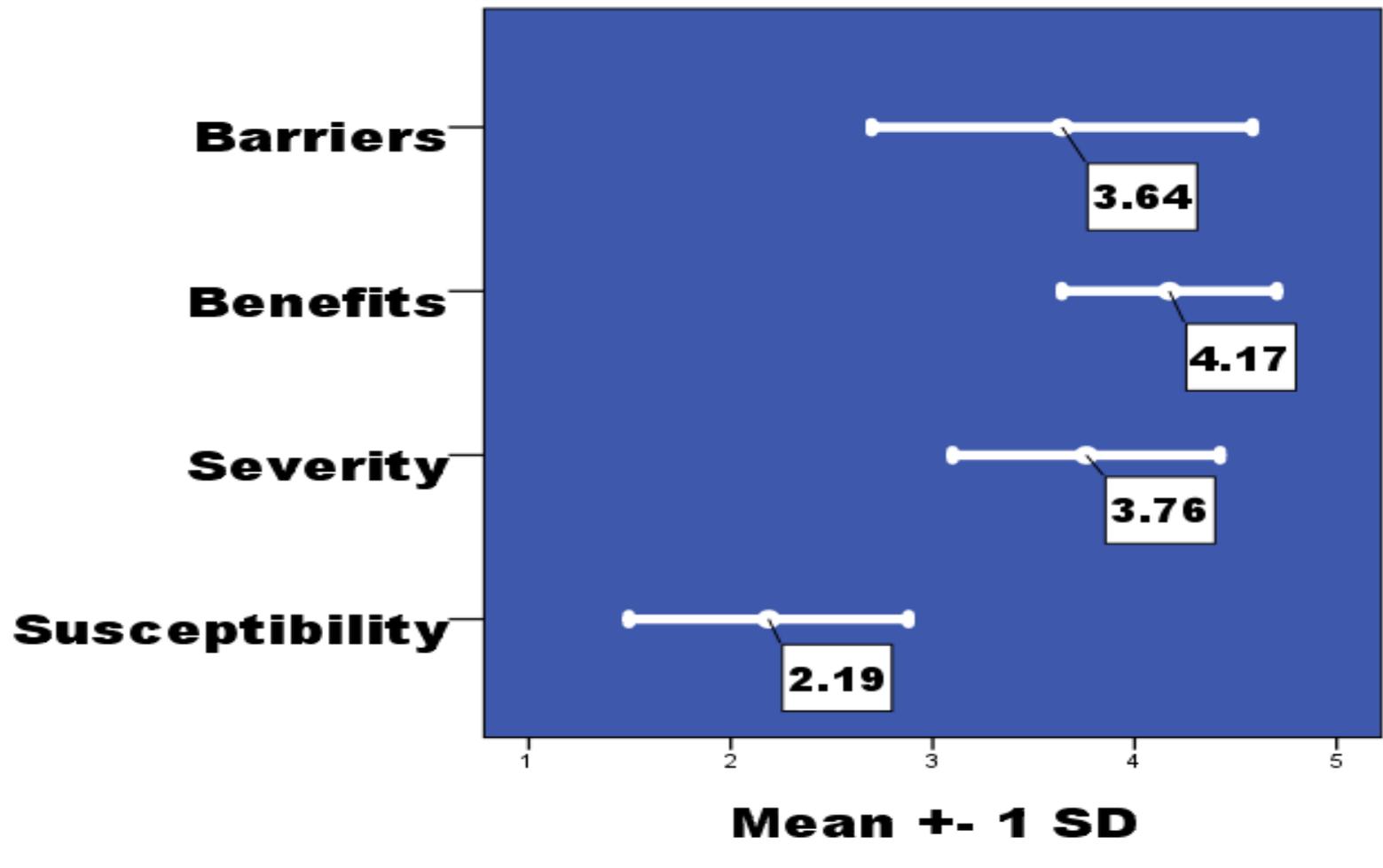
Demographics

- 32 CM Operators

- All male

- Age

   – Average: 39.3 years

   – Range: 21 – 59 years

- Mining experience

   – Average: 18.75 years

   – Range: 2.5 – 39.08 years

- Time at current job (CM operator)

   – Average: 7.2 years

   – Range: 0.8 – 31 years

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	2	3	4	5

Mean +- 1 SD

Interviews

- Conducted interviews at 3 mines
- 32 participants (pre- and posttest)

Major Issues

- Resistance to change
  - General negative attitude
  - Training tool
- CM operators as skilled technicians
  - More experience = less danger
  - Locus of control

Major Issues

- Production
  – Quantity vs. quality
  – Production demands vs. safety
- Need for education on the system
  – What does it do?
  – Where can CM operator stand?

Mine-Specific & Practical Issues

- Presence of miner helper

- Visibility

- Width of crosscuts/entries

- Float dust

- Work burden

Posttest Issues

- **Increased other hazards**
  – Shuttle cars
  – Unsupported roof
- **System issues**
  – Warning lights not noticed
  – Inconsistent fields
  – Field traveling on cable
- **Productivity**
  – Slows tramming
  – Difficulty turning a crosscut
  – Reduced daily production

CM Operator Suggestions

- Remove system, have 2 people working CMM

- Use as a training tool

- Increase accuracy and consistency of system

- Work with CM operators to set the field

- Put the sensor in the remote

- Design a smarter system

Future Plans

- Complete data collection

- Design educational campaign

Conclusion

- Operators
    - Are the ones who will have to use the system on a day-to-day basis
    - Are concerned & engaged in the implementation of proximity warning systems.
    - Provide a valuable resource of information on day-to-day operations of continuous mining machines

Questions?

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