

PURDUE UNIVERSITY - PROJECT 2: Development of Safer Trenching Operations

PROGRESS REPORT #3

(April 1, 2002 – June 30, 2002)

Research Team:

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Progress on objectives this quarter:

The key objectives of this project are as follows:

Objective 1: Identify causes of accidents in trenching operations (70% complete)

Objective 2: Establish an information database on work risk factors associated with trenching operations. (50% complete)

Objective 3: Develop strategies to prevent fatalities and reduce injuries in trenching operations (20% complete)

Percent complete: 65% approximately

Problems/Challenges: None this quarter

Summary of activities for the quarter:

1. The research team analyzed two hundred and ninety two (292) OSHA reports of fatalities in Trenching and Excavation Operations. All reports covered the period from 1997-2001. Preliminary analysis yielded the following observations:
 - a) Water, sewer, pipeline, communications and power line (35%), excavation work (20%) and plumbing/air-conditioning systems (13%) are areas with the highest trenching related fatalities.
 - b) 63% of the fatalities occurred in trenches less than 10 ft deep. 98% of the fatalities occurred in trenches less than 20 ft deep.
 - c) An analysis of the type of accidents showed that cave-ins was the primary cause in a majority of the cases (52%), followed by struck by equipment (15%) and struck by objects (9%).
 - d) 48% of the fatalities occurred in projects, which cost less than \$250,000. Sixty three percent (63%) of the fatalities occurred in projects with fewer than 10 workers on site.

2. A questionnaire was developed to be appended to the one prepared by Dr. Hinze (University of Florida). The combined questionnaire was sent to the National Utility Contractors Association (NUCA). The questionnaire is designed to seek data in the following areas: (i) safety in trenching operations, (ii) the role of the competent person on site, and (iii) practices currently implemented by NUCA contractors to prevent accidents in trenching operations.
3. The team is in the process of visiting project sites and meeting with safety managers in Lafayette (IN), Terre Haute (IN), Indianapolis (IN), Orlando (FL), and Miami (FL). Based on the site visits and the discussions, the research team believes that the primary challenges (as they pertain to safety) that contractors face in trenching operations are:
 - a) Digging around existing utilities – especially when support systems (shores/shields) have to be installed.
 - b) Issues related to the transient nature of the workforce, and the language and cultural issues of the work force.
4. The team has also developed a network of construction contacts through attendance at the Metro Indianapolis Coalition for Construction Safety (MICCS) dinner meeting on April 18, 2002.
5. Papers that have been accepted for presentation/publication:

C. Arboleda, D. M. Abraham, R. Wirahadikusumah, and J. Irizarry. *Trench-Related Fatalities in Construction and Development of Intervention Strategies*, 21st Century Construction Conference, Miami, Florida, April 2002 (in CD-ROM).

J. Lew, D. Abraham, R. Wirahadikusumah, J. Irizarry and C. Arboleda. *Excavation and Trenching Safety: Existing Standards and Challenges*. 3rd International Conference on implementation of safety and health on construction sites. One country - Two Systems. CIB99, Hong Kong, May 2002 (in CD-ROM).

J. Irizarry, D. M. Abraham, R. Wirahadikusumah, and C. Arboleda. *Analysis of Safety Issues in Trenching Operations*, CIB Conference, Cincinnati, September 2002.

Work planned for next quarter

- More site visits are planned for the July 2002-September 2002 period. These visits will be recorded and the main issues regarding safety in trenching operations will be identified. Also, interviews with the workers and foreman will be conducted to find the major issues in trenching operations at the work face.

- Statistical analyses will be conducted to find the major correlations between the causes of accidents. These correlations will help to find the best strategies to prevent accidents in trenching operations.
- A paper, describing the benefits of using Portable Electronic Devices to assist in field data collection at construction accident sites to record accidents, is in process.