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Standardizing Accelerated Bridge Construction

Weston Bellon
Utah State University

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Weston Bellon, *Utah State University* | Sattar Dorafshan, *Utah State University* | Dr. Marc Maguire, *Utah State University* | Dr. Marvin Halling, *Utah State University* | Dr. Paul Barr, *USU*

Introduction

Accelerated Bridge Construction (ABC) and the use of Self-Propelled Modular Transporters (SPMT's) is becoming more popular throughout the United States because of the following benefits:

- **Faster Construction Time.** Faster construction means shorter delays and a reduced product delivery time.
- **Increased Safety.** ABC increases safety for the laborer and the traveling public.
- **Reduced Economic Impact.** ABC can severely reduce the direct and indirect cost of lane closures.

This research provides standards for contractors and engineers to ensure these benefits are realized. To do this, the dynamic forces experienced by the bridge and false work during transportation were analyzed. The "worst case scenario" was determined to provide a conservative guideline for design and construction.

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Weston Bellon
Utah State University
Civil and Environmental Engineering
weston.bellon@gmail.com

Methods

In order to simulate actual construction scenarios, an SPMT was loaded with weights for the following procedure:

1. Start-Stop, Up-Down, 90° turns, uneven terrain, and rotation motion cases were analyzed.
2. Data gathered from accelerometers were converted to forces.
3. Data was analyzed to determine the "worst case scenario."

This process was repeated with 100 ton, 50 ton, and 15 ton loadings.

Results

Maximum acceleration values were determined for vertical and horizontal directions. Based on this information, "worst case scenarios" occurred for horizontal and vertical cases during Start-Stop and uneven terrain motion cases, respectively.

One of the time histories collected by the accelerometers can be seen in **Figure 2.** It represents acceleration over time for one of the accelerometers.

Figure 2 – Sample data from accelerometers

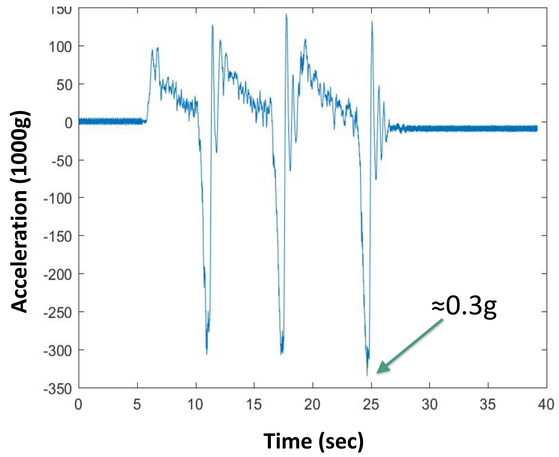

Figure 1 – Utah on the forefront of Bridge Construction Technology

SPMT's in use during the construction of Utah's I-215 / 4500 South Bridge. (Federal Highway Administration.)

Placing the accelerometers on the loaded SPMT.

Conclusions

To provide guidelines for the design and construction of future ABC projects, Peak Platform Acceleration (PPA) equations were developed based on empirical data.

Using these equations and the weight of the bridge, the dynamic forces, similar to an earthquake, on the bridge and false work can be evaluated.

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