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Standardizing Accelerated Bridge Construction

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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.

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.

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.

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**Figure 1 – Utah on the forefront of Bridge Construction Technology**

**Figure 2 – Sample data from accelerometers**

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.