

## **Transportation Structures—Field Investigation**

### **Types of Data to Be Collected and Recorded**

Identify transportation system losses. Attempt to identify primary and secondary impacts of transportation disruption, e.g., impact on emergency response, effects on other lifelines or on community, etc.

#### **CHECKLIST**

### **Transportation Structures**

#### **In General**

If disruption to transportation systems affected emergency response, refer to Section 12, Emergency Management and Response—Field Investigation for applicable checklists.

What was the impact of dysfunction on the transportation system?

All transportation structures should be assessed with respect to the primary and secondary impacts of loss, if any, of key transportation links.

#### **Highway Bridges and Overpasses**

1. Determine extent of damage and whether or not bridge is usable.
2. Compare, if applicable, pre- and post-1971 bridges in various intensity zones (particularly relevant in California).
3. Note orientation of longitudinal axis of bridge and compare damage of other structures having similar orientation.
4. Determine relative influences on bridge damage of differential earth movements, foundation failure, and ground shaking.
5. Examine connections or restraints between bridge elements. Note bearing details (“rocker-type” bearings are extremely vulnerable).
6. Determine dynamic action of backfills on retaining wall and bridge abutments.

#### **Roadbeds**

1. Determine whether or not any fill settlement was influenced by soil type and depth of underlying soils.
2. Did landslides occur? Were they related to soil types, cuts or fills, moisture content, or slope designs?
3. Was there damage due to surface fault rupture?

#### **Elevated Transportation Structures**

1. Check for damage in foundations, including piles and spread footings. Check foundation condition at abutments and columns.
2. Determine column type and check column connection detail at foundation and at deck or cap. Check for shear cracking, moment cracking, tilting.
3. Determine orientation of bridge axis.
4. Note deck bearing detail condition.

5. Note abutment condition. Was there deck impacting, dynamic action of backfill, or throwing of stones from deep holes?
6. Did wing wall cracking occur? What was dynamic action of backfill with respect to wing walls?
7. What is condition of apron? Check for slippage.
8. Determine expansion joint condition. Observe both from roadway and from underneath, if possible.
9. Examine approach road to deck and look for compressive failure, buckling, or settlement.
10. What is condition of superstructure? Was there lateral offset at joints, vertical displacement? Check girders, floor beams, stringers, and bracing.

### **Airports**

1. Document condition of control towers, including equipment and its anchorages.
2. Determine condition of runways and taxiways.
3. Note condition of emergency generator and its anchorage.

### **Public Transit Systems**

Inspection items will be similar to Elevated Transportation Structures, above. Also, refer to Section 9, Lifelines—Field Investigation: Communication Systems.

**Field Investigation Form—Bridge Structures (adapt as appropriate for other structures)**

Name of Investigator: \_\_\_\_\_ Date: \_\_\_\_\_

**Bridge Information**

Route/Interchange:

Bridge identification:

Length: \_\_\_\_\_ Width: \_\_\_\_\_ When Built:

Superstructure:

Substructure:

Abutments:

Hinges/Bearings:

Skew/Curve:

Retrofit:

Pre-Earthquake condition:

Strong motion recording instruments present?

Base isolation system, if applicable:

**Site Information**

Types of soils:

Sand boils?      Lateral spreading?

Ground faulting?

Foundation movement?

## Earthquake Damage to Structure

Total estimated loss:

Less than 10%      10–50%      over 50%

Is bridge functional? Yes \_\_\_\_\_ No \_\_\_\_\_ If no, why not?

If not functional, effect on route:

### Miscellaneous Data

Photos: Yes    No    Roll #    Frame(s) #:

Other:

Use back of this sheet for sketches and additional notes.

**Recommendations for Further (Short-Term) Research on Transportation Structures**

Name of Investigator: \_\_\_\_\_ Date: \_\_\_\_\_