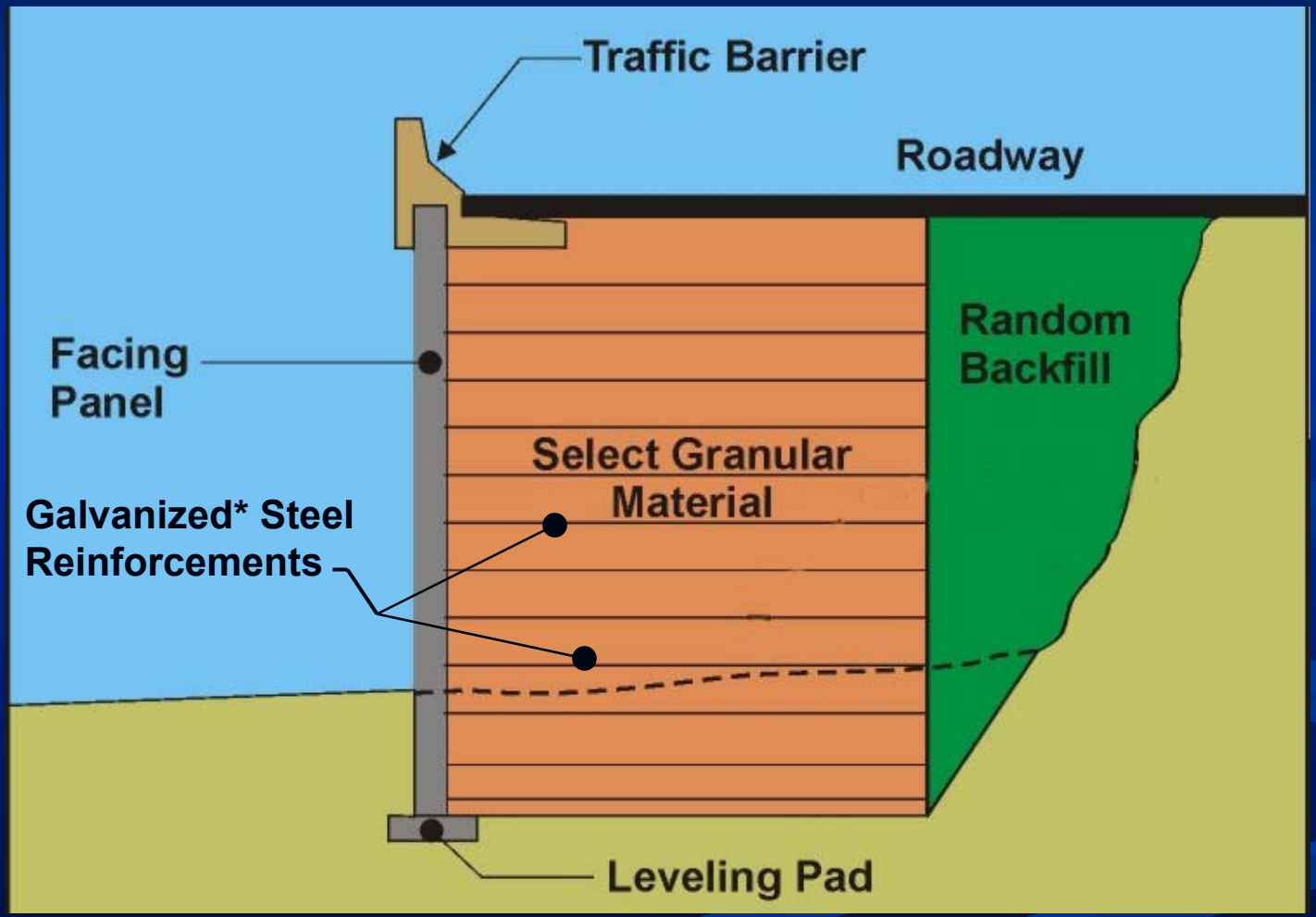
Recent Trends in the Use of Mechanically Stabilized Earth Bridge Abutments

Author:
Alexander Abraham – The Reinforced Earth Co.

Presented to
Purdue Geotechnical Society Workshop Program
Friday, March 31, 2006

Typical MSE Wall



*ASTM A-123, 86μm zinc thickness

MSE WALL DESIGN AND ENGINEERING

FEATURES DISCUSSED

- DESIGN LIFE
- TRUE ABUTMENTS

AASHTO Backfill Specifications
(Mildly Corrosive Environment)

pH	5 to 10
Resistivity	≥ 3000 ohm-cm
Chlorides	≤ 100 ppm
Sulfates	≤ 200 ppm
Organics	≤ 1%

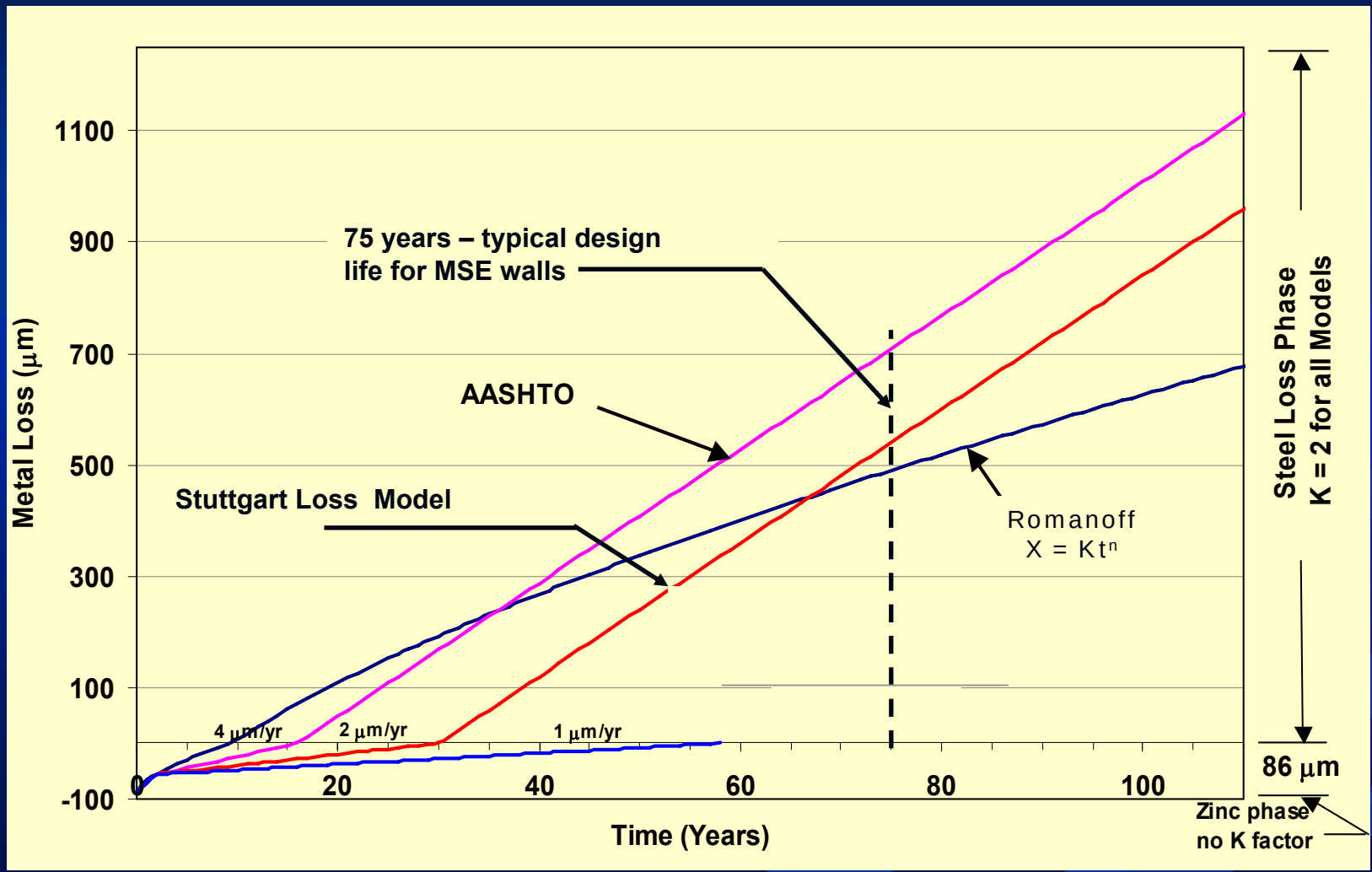
Research On Metal Loss Mechanism

- Romanoff
  - *Underground Corrosion*
- LCPC & TAI
  - Corrosion Cell Studies
  - Fill Criteria – pH, Resistivity, Cl, SO_4
- Metal Loss Models
  - Romanoff/Darbin: $X = Kt^n$
  - AASHTO - linearized

METAL LOSS RATES
Linear Loss Model

- Zinc (First Two Years) 15 µm yr
- Zinc (Until Depleted) 4 µm yr
- Carbon Steel (Up To 100 yrs) 12µm/yr

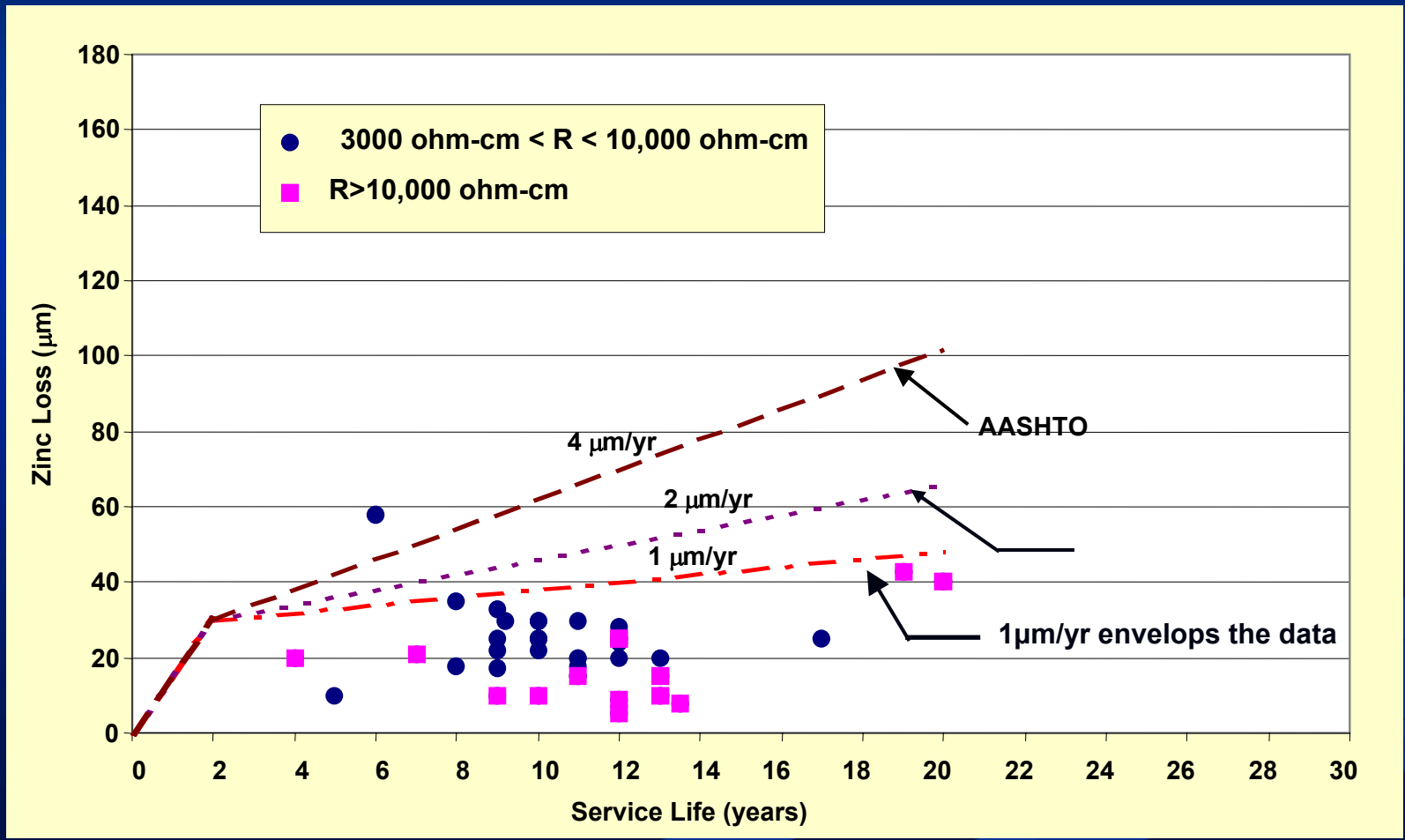
Compare Metal Loss Models



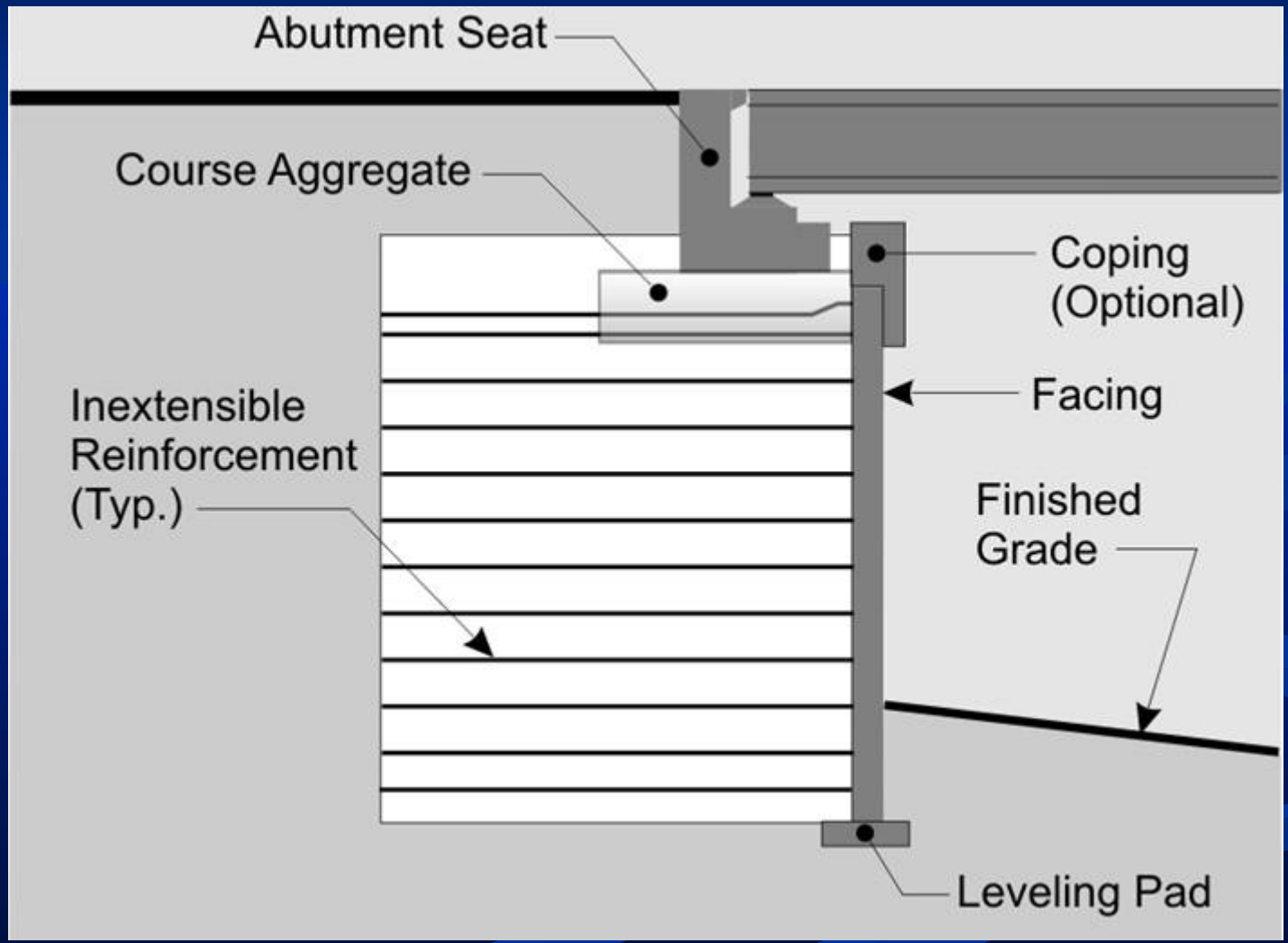
Investigations Of Structure Performance

- Exhume Specimens
  - Measure weight loss
- Half-cell Potential
  - Observe time to zinc depletion
- Linear Polarization Resistance
  - *Instantaneous* corrosion rate

Zinc Loss From Weight Loss Measurements



True MSE Abutment



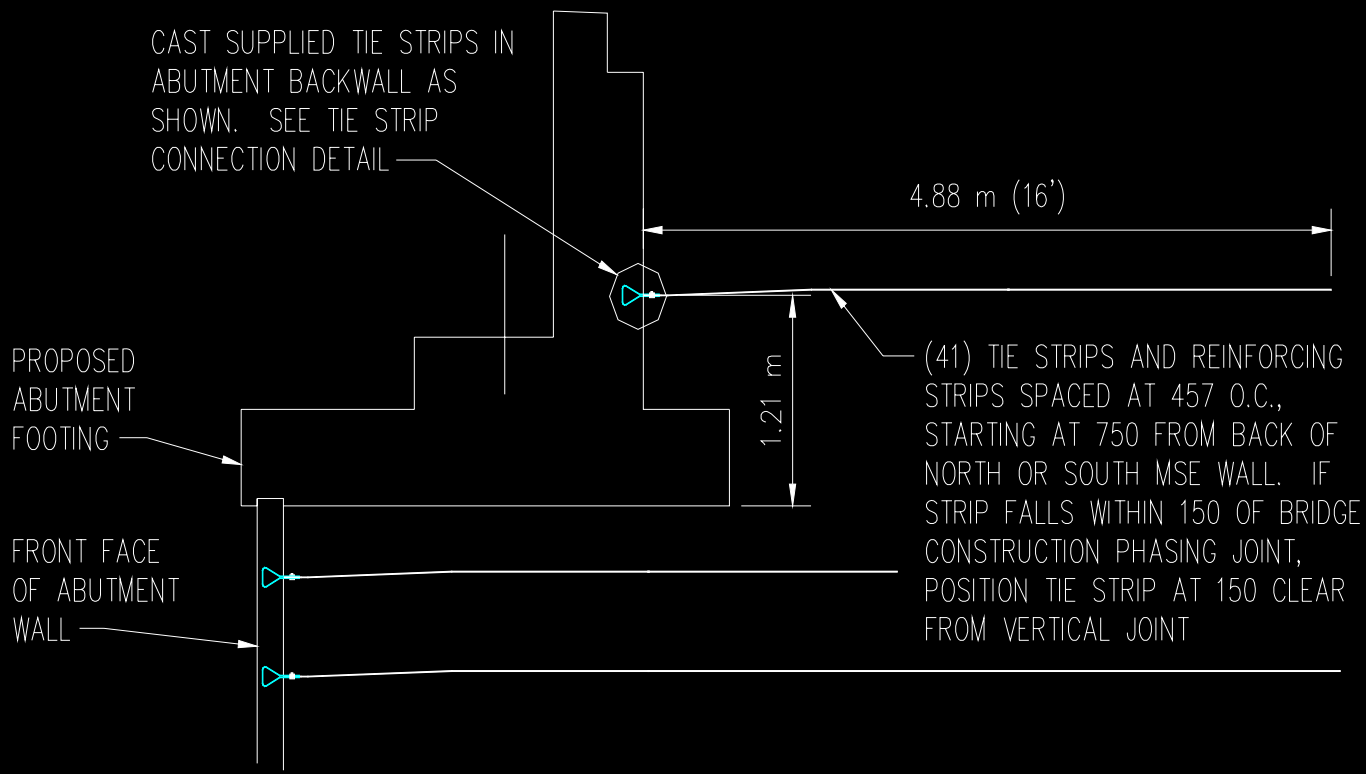
Route 417 Over Conrail
Steuben County, NY


Longest Span In
U.S.
(238 ft)

STH 131, VERNON CO., WI

117th ST. OVER METRA, BLUE ISLAND, COOK CO., IL

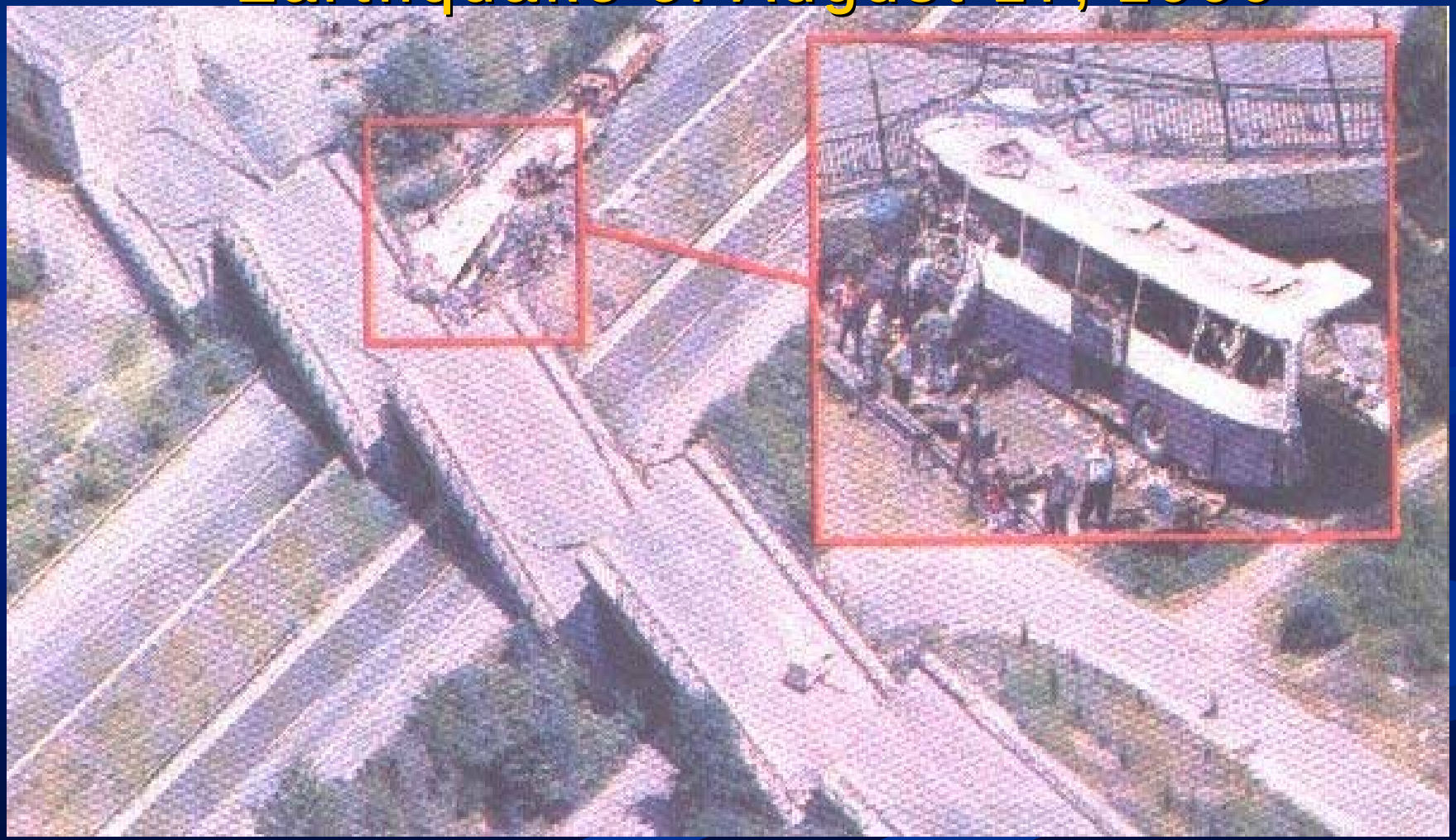
ABUTMENT GEOMETRY



ABUTMENT DETAIL

ABUTMENT GEOMETRY

Overpass Crossing the E80 at Artifye, Izmit (Kocaeli), Turkey Earthquake of August 17, 1999



MSE WALLS PERFORMED DURING 1999 EARTHQUAKE