

## BRIDGE REPAIR COST ESTIMATE WORKSHEET - KEY -

### Unit Cost Assumptions (Revised 2/1/2019)

**NEW BRIDGE** – Includes removal and replacement of a structure. *(sft of proposed deck area)*

*Increase deck area based on design standards and hydraulic requirements. Use the [Michigan Bridge Design Manual](#) (7.02.31) and [Michigan Design Guides](#) (6.05, 6.06) to determine appropriate geometrics. Use engineering judgement to determine hydraulic requirements and adjust the structure length accordingly.*

**Single or Multiple Spans, Grade Separation** – add road approach, demolition, & traffic control.

**Single Span, Over Water** – add road approach, demolition, & traffic control. *Length < 100ft*

**Multiple Spans, Over Water** – add road approach, demolition, & traffic control. *Length > 100ft*

**Precast Culvert** – add road approach, demolition, & traffic control. *Length < 40ft*

**NEW SUPERSTRUCTURE** – Includes removal of existing deck and superstructure.

*Assume replace-in-kind. Widen based on recommendation from Design.*

**New Superstructure, Grade Separation** – add road approach, demolition, traffic control. *(sft)*

**New Superstructure, Over Water** – add road approach, demolition, traffic control. *(sft)*

**WIDENING** – Includes cost of widening substructure units, superstructure, and deck.

**Structure Widening** – add additional cost of widening road approach. *(additional sft of deck area)*

**NEW DECK** – Includes removal of existing deck and barrier.

*Increase deck area based on design standards. Use the [Michigan Bridge Design Manual](#) (7.02.31) and [Michigan Design Guides](#) (6.05, 6.06) to determine appropriate geometrics.*

**New Bridge Deck & Barrier** – add road approach, demolition, traffic control. *(sft of proposed deck area)*

**DEMOLITION** – Includes removal of existing structure, add backfill and road work if structure is not replaced.

**Entire Structure, Grade Separation** – add traffic control. *(sft)*

**Entire Structure, Over Water** – add traffic control. *(sft)*

### **DECK REPAIR / TREATMENTS**

**Bridge Railing Replacement** – includes removal and replacement. Cost estimate is based on partial deck removal to develop lap length for barrier reinforcement. *(ft)*

**Concrete Brush Block/Curb Patch** – includes hand chipping and formwork. *(ft)*

**Concrete Barrier Patch** – includes hand chipping and formwork. *(sft)*

**Concrete Deck Patch** – includes hand chipping. *(sft)*

**Deep Overlay** – includes joint replacement and hydrodemolition, add bridge railing if required. Add “Overlay Removal” if there is an existing overlay on the deck. *(sft)*

**Epoxy Overlay** – includes warranty, surface preparation and application. *(syd)*

**Expansion Joint Gland Replacement** – includes removal and replacement of strip seal neoprene gland *(ft)*

**Expansion Joint Replacement** – includes removal and replacement. *(ft)*

**Full Depth Patch** – includes hand chipping and formwork. *(sft)*

**Healer/Sealer** – includes surface preparation and application. Penetrates cracks in bridge deck. *(syd)*

**HMA Overlay with WP Membrane** – includes HMA and waterproofing membrane. Add “Overlay Removal” if there is an existing overlay on the deck. *(sft)*

**Overlay Removal** – includes removal, specify existing overlay type and use associated costs. *(syd)*

**Reseal Bridge Joints** – includes removal and replacement of end joints and construction joints. *(ft)*

**Shallow Overlay** – includes joint replacement and hydrodemolition, add bridge railing if required. Add “Overlay Removal” if there is an existing overlay on the deck. *(sft)*

## **SUPERSTRUCTURE REPAIR**

**Bearing Realignment/Replacement** – includes temporary supports. *(ea)*

**Heat Straightening** – includes heat straightening, cleaning and coating of damaged steel beam due to high load hit. Costs based on a 35’ length, 3.5” web offset repair. For more localized distortions (i.e. flange only) cost may be reduced to \$30,000. There is a limited number of times a beam can be heat straightened, identify any previous heat straightening work performed. *(ea)*

**Pack Rust Repair** – use with built up steel sections that exhibit steel plate separation in excess of 3/8”. *(ft)*

**Paint – Complete** – includes cleaning and coating of entire structure. *(sft)*

**Paint – Partial/Spot/Zone** – includes cleaning and coating of partial structure. Minimum cost for this work is \$20,000. *(sft)*

**PCI Beam End Blockout** – includes temporary support, hand chipping and formwork. Use in locations where prestressed concrete beam ends exhibit deterioration affecting structural capacity. *(ea)*

**Pin & Hanger Replacement** – includes temporary supports, removal and replacement of pin and hanger assembly system. Add cleaning and coating. *(ft)*

**Structural Steel Repair** – includes cleaning and coating. Cost estimate based on a 6’ repair using a 6” x 9” x ½” bent plate. For stiffeners use \$1,200 per steel beam. *(ft)*

## **SUBSTRUCTURE REPAIR**

**Substructure Patching** – includes hand chipping, add temporary support if required. Field measured x 2, assume 4-6” depth. *(cft)*

**Substructure Replacement** – includes temporary supports, removal and replacement of substructure unit(s). Replace when repair area is greater than 30% of surface area. *(cft)*

**Substructure Horizontal Surface Sealer** – includes surface preparation and application to horizontal surface of concrete pier caps and abutment bridge seats. Use on horizontal concrete surfaces located under a joint. *(syd)*

**Temporary Supports** – includes excavation, installation, removal, and restoration. Add \$1,200 for each steel beam that requires stiffeners. Use engineering judgement to determine support type. Unique situations require complex temporary supports, increase costs up to \$6,000 each for unique situations. *(ea)*

## **MISCELLANEOUS**

**Articulating Concrete Block System (ACB)** – use for scour countermeasure when deemed appropriate by hydraulics. *(syd)*

**Concrete Surface Coating** – includes surface preparation and application of elastomeric coating. *(syd)*

**Culvert Cleanout** – includes removal of sediment and debris *(ft)*

**Epoxy Crack Injection** – includes flushing and structural crack repair. Minimum recommended width of 0.013", may be used for concrete beams and substructure units. *(ft)*

**Metal Mesh Panels** – include when deck bottom contains incipient spalls over travelled lanes. Standard panel width is 48", with a maximum 6'-6" length. *(sft)*

**Pressure Relief Joint** – include in ALL projects that contain a significant amount of concrete roadway (in excess of 1,000ft) adjacent to the structure. The purpose is to alleviate the effects of pavement growth that may cause distress to the structure. *(ft)*

**Riprap** – includes placement of riprap around substructure units. Assume 10ft distance around perimeter. Costs based on pay item with unit price in tons. *(syd)*

**Silane Treatment** – includes surface preparation and application. Penetrating sealer for concrete surfaces that absorbs into the concrete matrix to reduce moisture intake. Can be used for deck surface, barrier, superstructure and/or substructure. *(sft)*

**Slope Protection Repair** – includes removal and replacement of slope paving. *(syd)*

## **ROAD WORK**

**Approach Pavement, 12" RC** – includes removal of existing, add curb, gutter, guardrail, shoulder. Minimum distance of 20ft beyond reference line. *(syd)*

**Approach Curb & Gutter** – includes removal of existing. Estimate minimum 20ft each quadrant. *(ft)*

**Guardrail Anchorage to Bridge** – includes anchorage, transition, and posts. Depending on the detail, length may vary from 18'-9" to 43'-9". Anchorage required at each quadrant. *(ea)*

**Guardrail** – includes removal. Maximum length of 200ft beyond reference line. *(ft)*

**Guardrail Terminal** – also referred to as guardrail approach/end terminal. Terminal required at each quadrant that has a guardrail ending. Not required if guardrail will tie into existing guardrail. *(ea)*

**Roadway Approach Work** – use when roadwork is required beyond 20ft from reference lines. Additional cost may be required to transition crown, super, widening, or additional length when raising grade. *(LSUM)*

**Utilities** – coordinate with the corresponding Region/TSC/Utility/Permit Engineer to determine whether there are utilities at the site of the structure and whether they will be affected by the proposed construction. *(LSUM)*

**TRAFFIC CONTROL** – Unit costs to be determined by Region or TSC Traffic and Safety.

*Note: If bridge is within a road project, traffic control will in most cases be covered by the road project. If this is the case, please make note of it on the estimate form.*

**CONTINGENCY** – (10% - 20%), use higher contingency for small projects.

**MOBILIZATION** – Estimate at 10%

**INFLATION** – use 3% per year, starting with year 2020.