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# Example 1 - Simmonds Arch Bridge

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**CEF Instructional  
Guide  
(Version 2)  
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*Federal  
Emergency  
Management  
Agency*

**Example 1**      **Category C – Roads & Bridges – Simmonds Arch Bridge**

This example illustrates the use of R. S. Means unit prices for uncompleted work in the preparation of the CEF.

**Project Background**

The project involved estimating the cost to replace the Simmonds Arch Bridge. The bridge was destroyed in a declared flood disaster. The applicant is St. Joseph’s College, a public university, which owns and maintains the bridge. Public universities are eligible applicants and the bridge is an eligible facility. The bridge, all 4 wing-walls, and approximately 25 feet of the north and south approach slabs, were at least 80% destroyed. The guardrails and bridge railing were not salvageable. Because the bridge is more than 50% damaged, the bridge is eligible for replacement in kind. R.S. Means unit costs were used to estimate the costs of the work, which has not yet been completed.

The Simmonds Arch Bridge is located approximately 150 feet from the Lundberg Dam on Tom's Creek. The bridge was approximately 15 years old and functional. The earth-filled arch structure was 24 feet long (across the stream) and 26 feet wide (along the streamline). The waterway opening is 24 feet wide at the base, three feet high at the sides, and five feet high in the center. Each abutment is on a slab footing 24 feet long, three feet wide and two feet deep. Approaches have four inches of asphalt concrete pavement over a six-inch base course. The bridge (including grassed walkway along the western side of the bridge) and 25 feet of approach on each side were destroyed. Debris from the washed out bridge is visible in the creek 50 feet downstream. The arch culvert is similar to a box culvert. A local contractor has quoted the project formulation team an installed cost of a box culvert at \$930/cy during the site visit. Safe speed on the bridge is 15 mph and it handles approximately 50 vehicles per day. The load limit is 15 tons and the drainage area to this point is 50 acres.

**Information relating to the calculation of CEF factors**

Replacement work associated with Simmonds Arch Bridge and the approach roadways are considered Category C. The degree of difficulty of the masonry work and bridge replacement work is considered moderate. The work will be performed at the bridge site in Maryland. Quantities for this CEF were based on measurements taken during the site visit conducted by the project formulation team, and were cross-checked against the “As-Built” drawings of the bridge provided by the applicant.

The City Cost Indices for Silver Spring, MD have been established by the PAO from R.S. Means as:

<u>Division</u>	<u>City Cost Index</u>
2	0.86
3	0.89
4	0.84
5	0.97
6	0.78
7	0.89
8	0.87
9	0.82
10 - 14	0.96
15	0.90
16	0.93