Abstract

The barriers faced the bridge is the water (river). The types of bridge beams/girders which we know is a composite steel girder bridges and prestressed concrete girder bridge. Steel girder bridges use composite material for structural such as steel material for beams and concrete material for the deck bridge. Prestressed concrete girder bridge use prestressed concrete materials for structural beams and concrete material for the deck bridge. In the initial design, the bridge use a steel structure as the main structure with a total span of 50 meters which is divided into a span of 10 meters, 30 meters and 10 meters. Alternative designs use prestressed concrete structure as the main structure with the same span of 50 meters. Spans 30 meters use PCI-Girder structure and spans 10 meters using voided slab structure. PCI-Girder structure and voided slab use the same material prestressed concrete. There are 6 phase of analysis through a value engineering such as, the information phase, the analysis functions phase, the creative phase, the evaluation phase, the development phase and the recommendation phase. In this phase of the analysis showed that the bridge using prestressed concrete structures have a better score than the initial design of the bridge using a steel girder bridge. At the development phase, the best economically alternative is done by calculating life cycle cost by using the program life cycle cost projection tool. The initial cost of bridge construction steel structures are Rp.5,734,908,947,-. The initial cost of construction of prestressed concrete bridge structures are Rp.4,608,294,070,-. The initial cost of construction (Initial Cost) on the bridge of prestressed concrete structures has the potential savings of Rp.1,126,614,877,-/19,64% of the initial design of the bridge. Through the analysis results using the program life cycle cost projection tool, the annual cost of bridge steel structures for the next 20 years is Rp. 1,055,303,709,-. Annual costs of bridge prestressed concrete structures for the next 20 years is Rp. 887,825,846,-. Therefore, the annual cost for 20 years prestressed concrete bridge structure has the potential savings of Rp. 167,477,863,-/15,87%. Through value engineering approach that has been done, it is recommended to use prestressed concrete bridge structure as the main structure of the bridge.

Keywords*: bridge, PCI-Girder, voided slab, steel, value engineering, life cycle cost.*