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Structural Characteristics and Application of Kawasaki Composite Slab Bridges

Keinosuke Hamada, Tomoo Kasuga, Masakatsu Sato, Sachito Tanaka

Synopsis :

Composite slab bridge has been newly developed as a simple support highway bridge. It consists of deformed flange T-shapes, bottom steel plates and expansive concrete. The depth of this bridge is much smaller than those of conventional bridges. Moreover, since steel plates act as a concrete form, erection work is very simple, rapid and safe. The structural characteristics and fatigue strength of this slab bridge has been clarified by a static bending rupture test and high-cycle fatigue test respectively. As the result of the tests, the design method has been justified and design in general is offered. Demand for this slab bridge increases every year accompanying river improvement and railway overpass projects.

The body can be viewed from the next page.

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the T-shapes functioning as a shear connector, thus permitting the use of thinner concrete covering and the use of the bottom plate as a permanent form at the time of concrete placing, thereby simplifying the execution of

work and shortening the construction period—have been recognized by users, resulting in increased orders.

In this paper, the structural characteristics of this

composite slab bridge shown in a static bending rupture test and a high-cycle fatigue test are described. Design

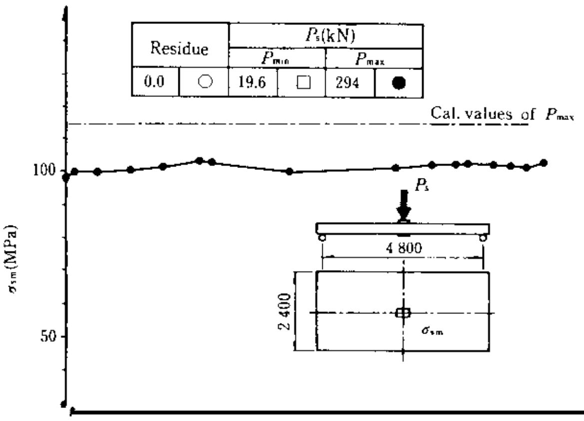
ening of the construction placing is possible.

(6) Through the use of the atmospheric corrosion resisting steels, repainting becomes unnecessary, thereby lowering maintenance and repair costs.

3 Clarification of Structural Characteristics[2)]

3.1 Purpose of Experiments

A static bending rupture test was conducted on a



Number of cycles

Fig. 7 Relation between number of cycles and tensile-

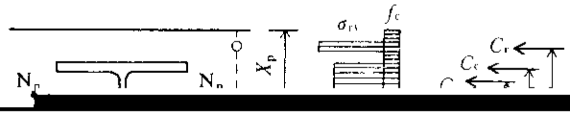
$$y_{cu} = \frac{nA_s}{B}\left(-1 + \sqrt{1 + \frac{2Bg_s}{nA_s}}\right) \cdots\cdots\cdots\cdots (2)$$

where

B: Intervals of deformed flange T-shapes (cm)
A_s: Sectional area of steel girder (cm^2)
g_s: Distance from extreme upper edge of concrete to center of gravity
n: Elastic modulus ratio of steel to concrete

Next, the moment of inertia I_V concerning the neutral axis of the composite slab converted into steel is obtained by Eq. (3)

I_s: Moment of inertia of steel-girder cross section (cm^4)



4.3 Design Procedure

Design is carried out as shown below based on

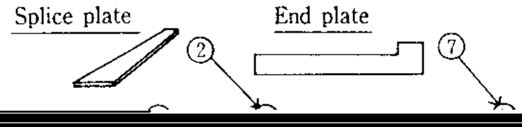

Splice plate
End plate
2
7

Table 1 Summary of composite slab bridge specifications