

Research Trends and Results

The damage evaluation technique from the point appearance for the highway steel bridge heat affected by a fire

TAMAKOSHI Takashi, Head

ISHIO Mari, Researcher

YOKOI Yoshiteru, Resercher

Bridge and Structure Division, Road Department

(Key words) Highway bridge, paint, , Coat, Estimating damaged temperature, Heating test

1. Introduction

In recent years, there have been examples of highway bridges being damaged in the fire. With the temperature of a fire the kinetic property of steel materials changes. In order for a road administrator to judge the propriety of access or the contents of repair reinforcement, it is necessary to get to correctly know the temperature of the heat of a fire early. On the other hand, the factors from which painted steel materials change are "temperature" and "the kind of paint." Therefore, it is necessary to clarify the temperature and the relation of painted steel damaged by fire for every paint specification. It is utilizable for the presumption about the damage at the time of suffering from such a calamity. There are situations where the surfaces differ because of the heat on the steel plate with various paints.

The test in which a steel plate was heated in a gas furnace and a electric furnace was carried out to understand the relation between heating temperature and turns of painted steel was investigated. In order to presume the temperature which the steel materials received, "Collection of samples of the painted steel" was published.

2. Experiment Method

Test specimens were two kinds of steel plates. The first was a specimen with five kinds of coating which are generally adopted in Japan were prepared. The other that was cut out from a removed bridge was prepared. The two was tested in the furnaces as shown in Figure 1 and Figure 2, a gas furnace and an electric furnace in order to investigate the relationship between the supply of oxygen and damage to the painted steel after the test.

3. Test Results

Table1 shows observation of surfaces after the tests.4. Conclusion

We have implemented testing under conditions of various coating types, deterioration degrees, heating

methods and so on so as to make the coating damage samples to estimate the temperature of received heat as existed possibility to estimate the temperature from the state of damaged coating.

From now on, we are to proceed on the heating test of existing bridges with different coating types and deterioration degrees in order to collect sample images. Note also that we would like to make public the heat control method and detailed methods of obtaining sample image data established in this research and image data to be shot continuously in the laboratory.



Fig. 1 Gas furnace Fig.2 Electric furnace

Table1 The specimen released for observation after the test by gas furnace

temperature	Coating type				
	A-1	A-2	B-1	C-1	C-5
before tests					
200°C					
300°C					
400°C					
500°C					
600°C					
700°C					

【Reference】 NILIM Material 710 posted

<http://www.nilim.go.jp/lab/gcg/index.htm>