Experimental Testing of Stirrup Corroded RC Beam with Oblique Steel Reinforcement

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Summary

In this paper, 6 simply-supported RC beam with boliqur steel and stirrups reiforcements are corroded and an uncorroded RC beam as a comparative analysis were employed to test shear performance of inclined section, considering corrosion loss of cross section of stirrups and concrete, also taken the influence of bonding and dowel action between steel and concrete into accounts. This paper analyzes corrosion and establishes inclined section bearing capacity calculation model of corroded reinforced concrete for freely supported beam. This study will help understanding that under the state of corrosion of the stirrups, the shear capacity of reinforced concrete members equipped with corroded main bar. For different corrosion specimens, it is not true to form the judgement that the internal load-carrying capacity of the specimens reduce with the degree of corrosion deepen by direct observation from the appearance

Keywords: Corroded Beam; corrosion; oblique reinforcement; accelerated corrosion testing; loading.

1. Introduction

With the development of the erosion of Reinforced Concrete (RC) structures over the world, the performance of engineering structures will gradually degrade, resulting in brittle destruction of the inclined section, the consequences of its destruction will be much more serious than that of the normal cross section due to chloride-damaged environments.

In recent years, the influences of corrosion of reinforcement on mechanical behaviour of RC structures is reflected in the following three aspects: 1) flexural property of structural members;2) bond-slip properties between steel reinforcement and concrete; and 3) the mechanical properties of corroded steel reinforcement. The test and analytical results show that with the propagation of the extent of corrosion of reinforcement, the load-carrying capacities and ductility of bending element reduced significantly [1-3]. The interaction between steel and concrete gradually weaken as the corrosion loss of the cross section of steel reinforcement increases [4-6], and yield strength and elongation rate for reinforcing bar decreased significantly [7-8]. Field surveys on actual bridge engineering show that for the small bar diameter and at the most weakest position of the outer reinforcement skeleton it is more sensitive to the external environment. The extent of corrosion of stirrups is more serious than those of longitudinal or inclined reinforcing bar. The corrosion of

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