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大跨径预应力混凝土连续梁桥地震反应分析(PDF)

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Title: Seismic response analysis for long-span continuous bridges

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关键词: [连续梁桥](#); [地震波](#); [行波效应](#); [地震反应分析](#)

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摘要: 大跨连续梁桥纵向延伸较长,地震发生时各个支承处的地震波的振幅和频率是不同的。以某12跨预应力混凝土连续梁桥为例,推导了结构的运动方程,采用有限元结构分析软件ANSYS建立了该桥的动力分析模型,进行了模态分析和时程分析。通过输入不同波速的地震波,计算行波激励下桥梁的地震反应,并和一致激励下的结果进行对比,分析了行波效应对桥梁地震反应的影响。结果表明:滑动支座摩擦力减小了桥梁纵向的地震反应,但对桥梁横向地震反应影响较小。行波效应减小了制动墩的纵向地震反应,增大了其它桥墩的纵向地震反应,但对桥梁横向地震反应影响较小。

Abstract: Long-span continuous bridges have large extended length longitudinally and the amplitude and frequency of the earthquake wave at different supports of the bridges are different when earthquake occurs. In this paper, by taking a 12-span continuous prestressed concrete bridge as an example, the dynamic equation of the structure was derived, and the dynamic model of the bridge was also established by use of finite element analysis program ANSYS. Furthermore, the modal analysis and time history analysis of the bridge were carried out. The seismic responses analysis of the bridge under excitation of travelling were numerically simulated and compared with the results from the case of constant excitation. It shows that the glide support friction force reduces the bridge longitudinal earthquake response, but has a less influence on its transversal earthquake response. The traveling wave effect reduces the longitudinal earthquake response of braking pillar and increases longitudinal earthquake response of other bridge piers, but has a less influence on the transversal earthquake response of the bridge.

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