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Seismic response study on a multi-span cable-stayed bridge scale model under multi-support excitations. Part I: shaking table tests

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Seismic disaster of Multi-span cable-stayed bridges



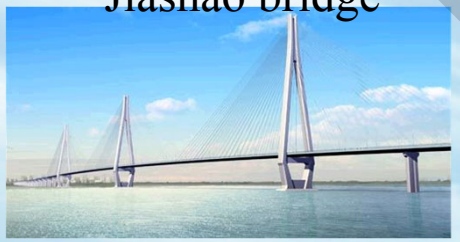
Ting Kau bridge



Dongting lake bridge



Jiashao bridge



Erqi Yangtze river bridge

Bridge examples become more popular

Structural stiffness become more flexible

Suffering earthquake become more frequency



Stripping of Tower



Rockfall of girder



Retrench of cable

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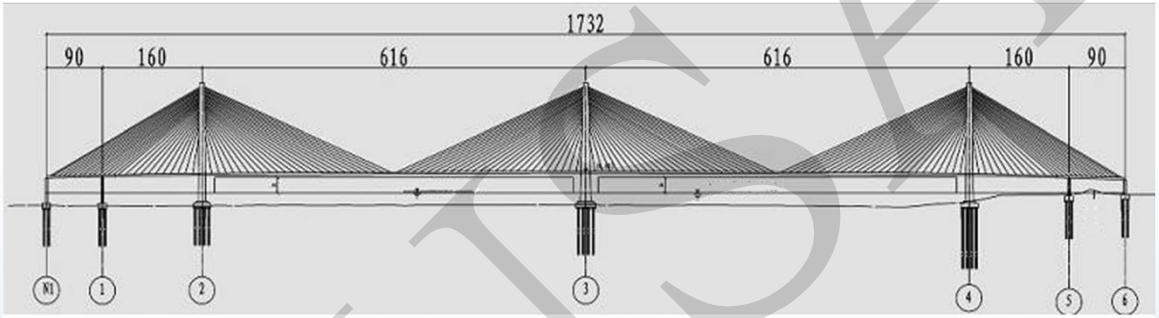
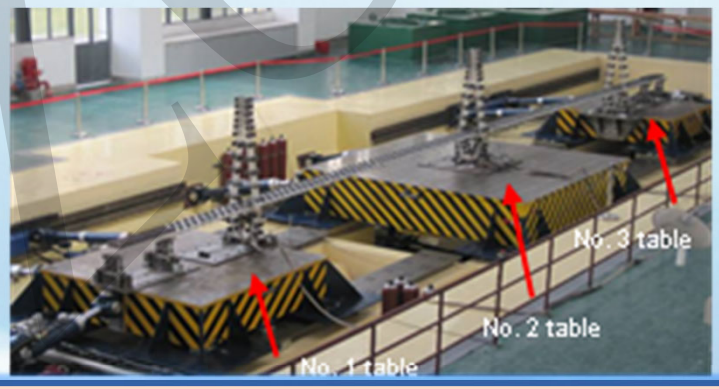
Shaking table tests

Experimental research method



Prototype of a multi-span cable-stayed bridge (m)



Scale model of the whole bridge with 1:100

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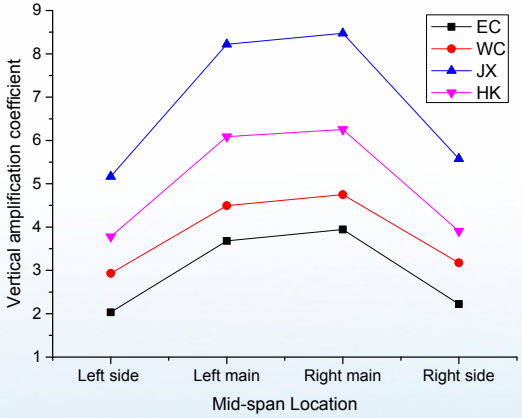
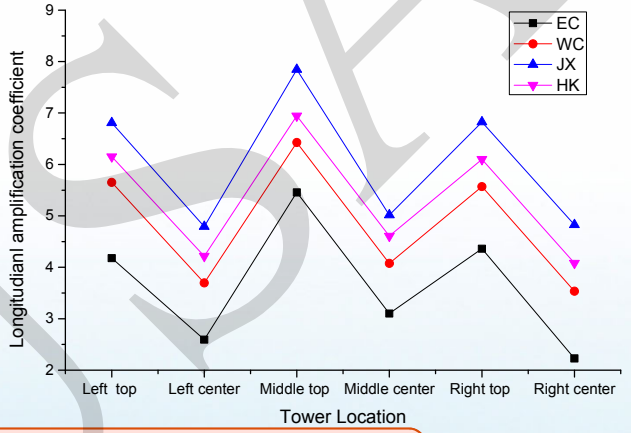
Multi-support excitations

Uniform excitations under four seismic excitations

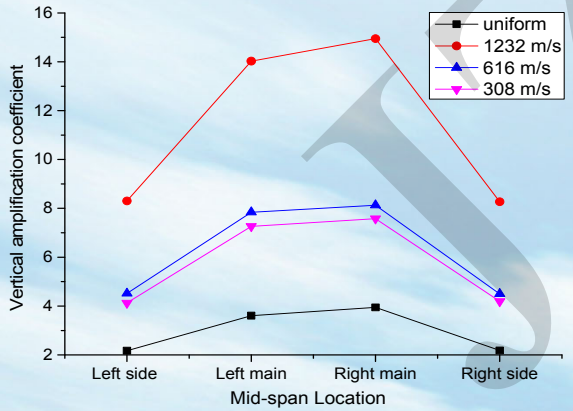


Seismic responses of main girder

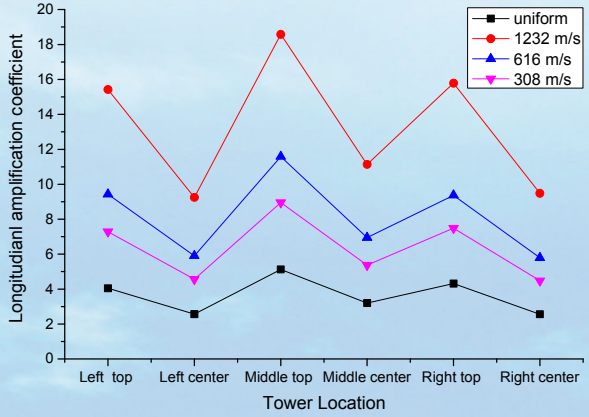


Seismic responses of main towers

Non-uniform excitations by traveling wave effect



Seismic responses of main girder



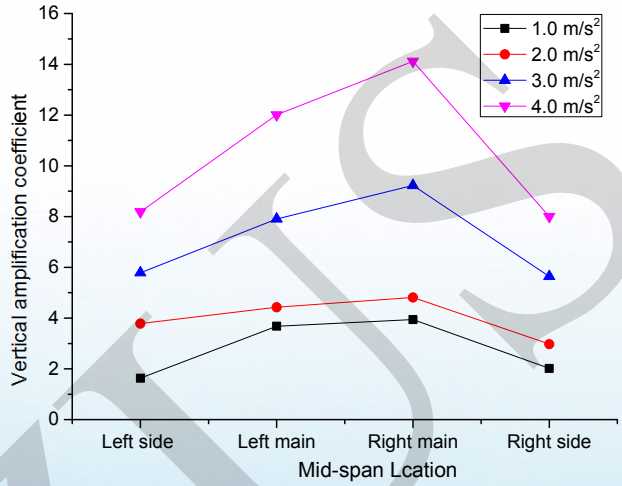
Seismic responses of main towers

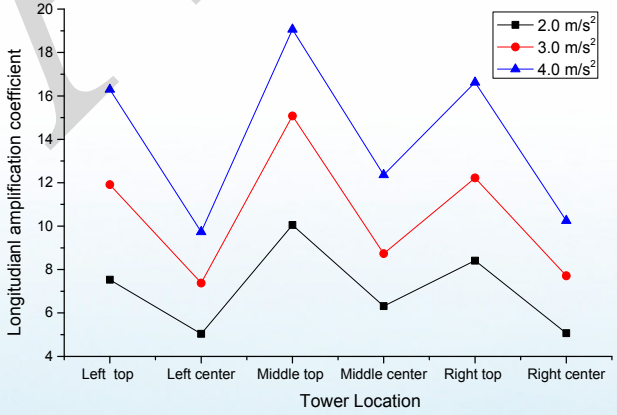
Multi-support excitations under strong earthquake

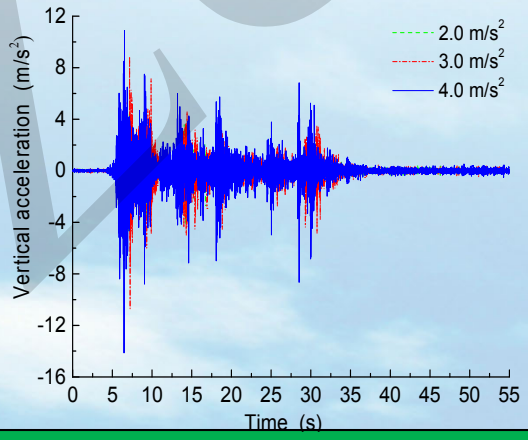
Uniform excitations under strong earthquake

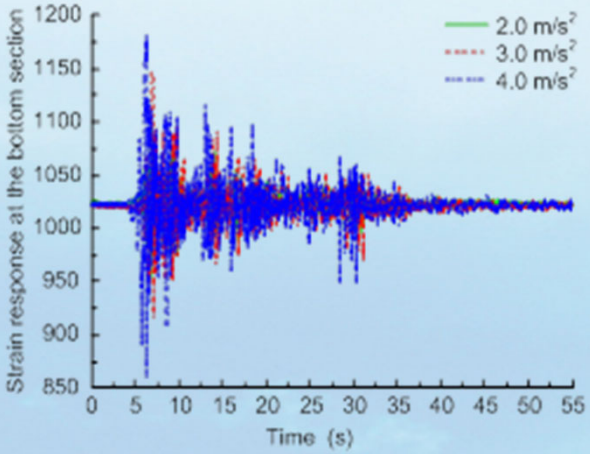


Shear failure of bearing at middle tower









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Conclusions

▽ **S**eismic responses of the main girder and towers for the scale model were most evident under Jiangxin (JX) wave among for uniform excitations

▽ Seismic performance of the main girder and towers for the scale model were adversely affected by traveling wave effects

▽ Shear failure of the bearing of the middle tower first appeared when subjected to the strong excitation

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