Rotordynamic prediction of mode order transition when rotor has an overhang

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中文关键词： rotordynamics　turbomachinery　rotor with overhang　console modes　balancing

英文关键词：rotordynamics　turbomachinery　rotor with overhang　console modes　balancing

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中文摘要：

　　Nowadays rotating machinery grows and develops extremely fast due to its multi-branch application. Although the fields of rotordynamics and rotor balancing had a strong background based on previous experience in order to perform efficient and safe operation for the rotating machines, still there are problems which are hard to be dealt with in some special cases. One of them is balancing of the rotor with huge overhang. Rotor with overhang is inherent to have console modes, which previously often were observed separately from the other modes in rotordynamic literature. In such a way console modes, their behavior, order of appearance and interaction with other modes were described in current paper in more details. Obtained results confirmed that console modes obey the principle of orthogonality in the same way as all other modes and hence could be efficiently balanced using modal balancing method. Simulation results revealed likelihood of such phenomena as modes order transition, when the rotor has an overhang. As a consequence perfectly balanced console rotor could not be so due to modes order transition effect when the bearing stiffness in situ differs from bearing stiffness of balancing equipment. Described results will be useful for engineers who are involved in area of rotating machinery vibration tuning for the rotor with huge overhang and benefit them to recognize these modes efficiently and to perform balancing successfully.

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