OSCILANT PLATFORM

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Summary:
The growing importance of detrimental vibrations on mobile machinery, magnified by increasing working speed, emphasizes the need to evolve from static to dynamic design of mechanical system. Stimulators are an indispensable tool to study present-day machinery dynamics in a repeatable way, under controlled laboratory conditions. The kinematic and dynamic aspects of a shaker design become more and more complex, as modern test rigs have an increased number of degrees of freedom and allow faster movements.

Modal analysis.
A modal analysis is performed to determine the resonance frequencies and corresponding mode shapes. To simulate the influence of load (cylinders, platform and test object) on the designs, a point mass of 400 kg is added on the contact spot between the cylinder and the support. Calculations are restricted to the first two mode shapes because only the lowest resonance frequency is a design criterion and, as explained before, should exceed 40 Hz. None of the original supports complied with the imposed frequency constraint. Therefore, they were strengthened and simulations were run again. For the first type of support, it seemed that doubling the height of the four supporters, as was necessary to meet stress requirements, was also a feasible solution. The other types of supports were reinforced by two additional supporters behind the vertical beam. The lowest eigen frequency of the third design increases less by the reinforcement than that of the second design. The explanation lies with the negative effect of the support height on its rigidity.[4]

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