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Magnetic gauge for free surface velocities due to rock blasts YECHESKEL ASHUACH, ITAI GISSIS, CHEN AVINADAV, Rafael Advanced Defense Systems, Ltd. — We developed a simple magnetic gauge for measuring free surface velocities of rock materials in the range of 0.1-20 m/s. The gauge consists of two elements: a NdFeB magnet and a pick-up coil. The coil is attached to the free surface at the point of interest. The magnet is placed a few centimeters away from the coil on its central axis, intact from the rock. Rock surface movement due to blast loading induces current in the coil due to change of the magnetic flux. The coil velocity is deduced from the measured current using a computational code. The gauge was tested and validated in a set of free-falling experiments. We present velocity measurements from various blast experiments in limestone and reinforced concrete, using both the magnetic gauge and a Doppler interferometer. The results obtained from the two measurement techniques were in good agreement during a few milliseconds. The magnetic gauge is cheap and very simple to operate, and therefore favorable for mapping the velocity distribution at multiple points of interest on the surface.

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