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REPLY TO THE COMMENTS BY JACOBO BIELAK CONCERNING THE PAPER

VERTICAL VIBRATION OF A RIGID CIRCULAR BODY AND HARMONIC ROCKING OF A RIGID RECTANGULAR BODY ON AN ELASTIC STRATUM

THE references to Bycroft and Warburton fail to mention the essential point that their works depend on an erroneous fundamental assumption which makes conclusions from subsequent analysis to be suspect.

They have not formulated the exact governing dual integral equations but have resorted to making an initial assumption that the unknown dynamic stress distribution under the vibrating rigid body on a stratum is the same as the static stress distribution under a rigid body on an infinitely deep medium. They then proceed to find the displacement under the rigid body. As to be expected, this displacement is found not to be constant contrary to the physical condition of constant displacement under a rigid base. Their computation is then based on finding a "weighted" average of the resulting varying displacement. The author in the abstract and introduction has pointed out one major erroneous conclusion from their works. Not only is that conclusion contrary to the physical situation but also has it been shown to contradict even their own experimental results. There is no basis, therefore, for using any other conclusion from their works as a reliable standard of comparison.

The author has also indicated that one can reduce dual integral equations to single integral equations of the Fredholm type and proceed to numerical work. This tedious approach is not only well-known but also it lacks the elegance of understanding a whole class of problems considered through the novel physical analogy with vibrations on a semi-infinite elastic medium the behaviour of which is now pretty well understood.

Like Professor Bielak, the author realizes that the analogy has its limitations which have been clearly mentioned in the paper. However, the range over which the work is valid and for which agreement with experimental works is not only consistent but also on a justifiable physical basis is wide enough to cover most practical cases of inertia ratio of the vibrating body.

It is emphasized that a vibrating medium of infinite lateral extent will always dissipate energy through the dispersion of waves and therefore produce damping which will limit amplitude. There is no physical reason why this damping can ever be non-existent in such a vibrating medium.

However, even a semi-infinite medium which has the maximum capacity for dispersing waves has been shown in the case of vertical vibration not to produce so much damping as to affect significantly resonant frequency especially for large inertia ratio bodies. Dispersion damping is even much less in rotational cases.

The conclusion, therefore, is that the approximation of the work is considered to remain valid over a wide range of large inertia ratio bodies for low frequency factor vibrations subject only to the condition $\eta_2 > 1/\tilde{h}$.

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