

COMPARISON OF DIFFERENT PROCEDURES FOR COMPUTING THE STRESS INTENSITY FACTOR RANGE FOR FATIGUE CRACK GROWTH TESTING AT 20 KHZ

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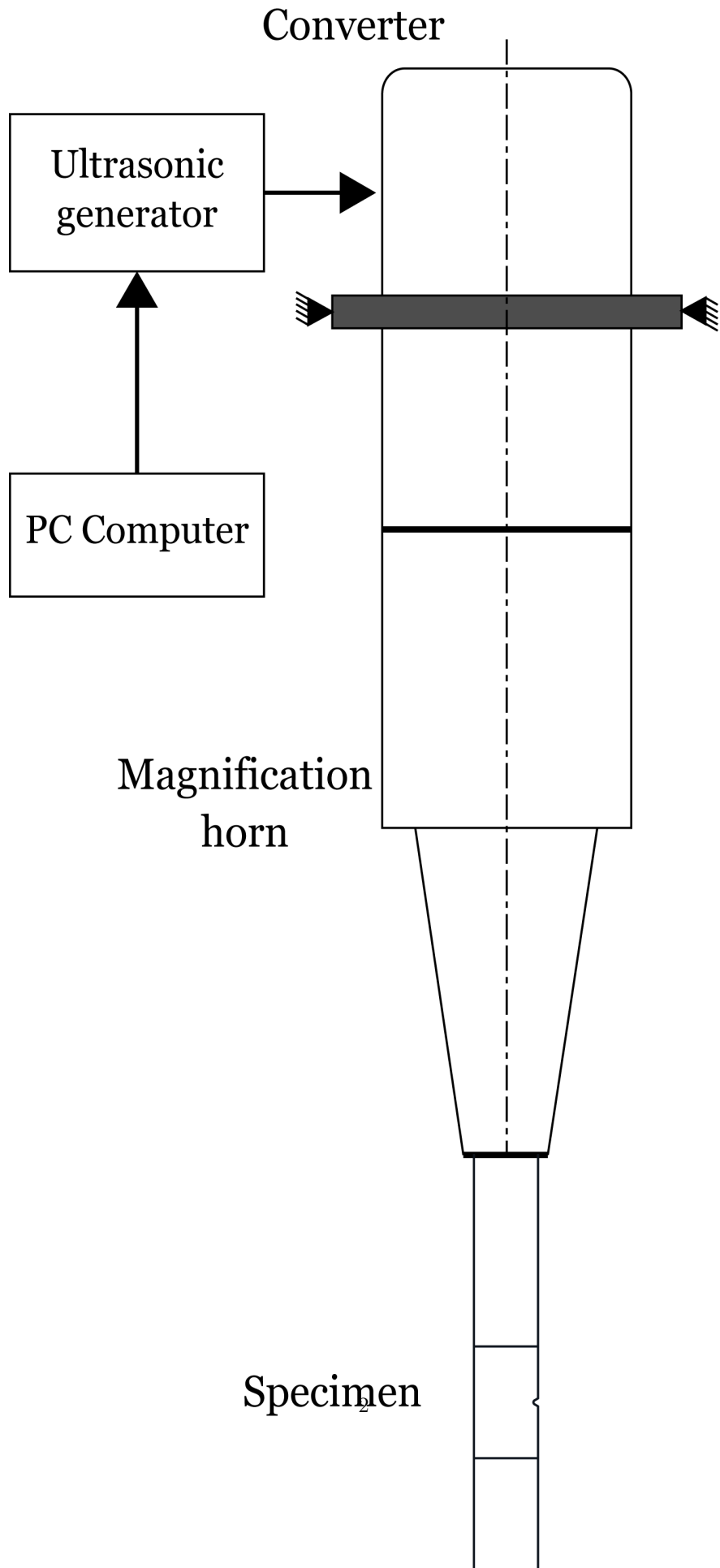
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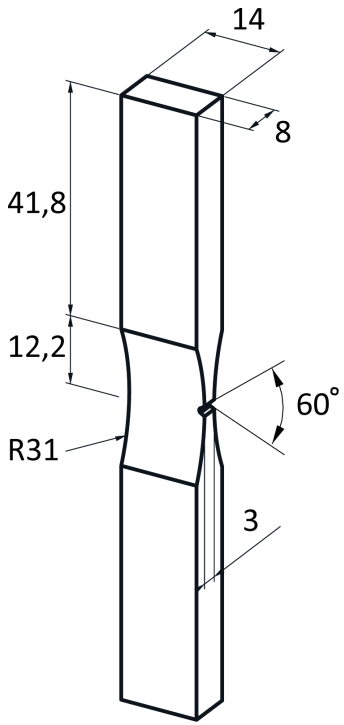
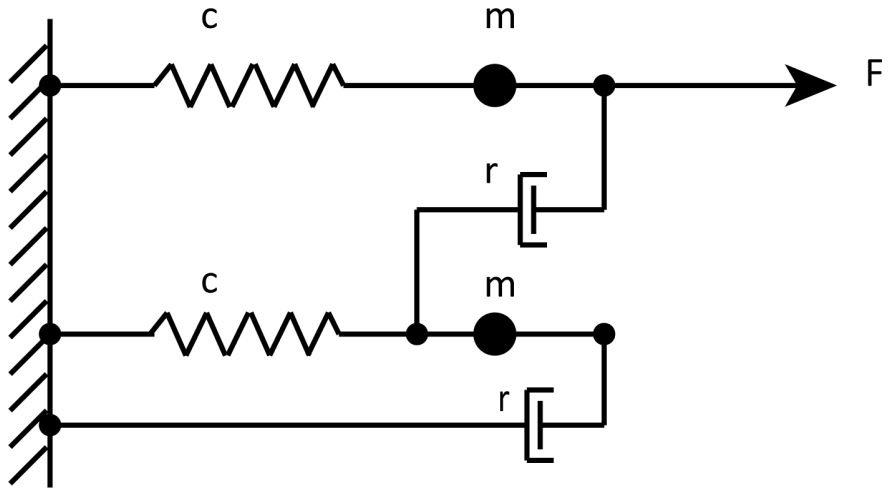
Abstract

When computing the stress intensity factor (SIF) for high frequency loading it is important to consider dynamic effects such as inertia forces and damping. In the present study, different dynamic simulation procedures were carried out and the achieved SIF values were compared. Fast computation procedures such as modal analysis and direct steady-state analysis were compared to the computationally expensive transient dynamic analysis. Two different methods for calculating the SIF, the J-integral and the CTOD methods, were applied and compared and the results showed a near perfect agreement in calculation of the mode I SIF. The Rayleigh damping model was introduced into the dynamic computation to investigate its effect and the results revealed a clear effect on the SIF at 20 kHz frequency. The fast direct steady-state analysis showed good agreement to both modal and transient analysis with the different damping values used and is recommended as the most effective procedure.

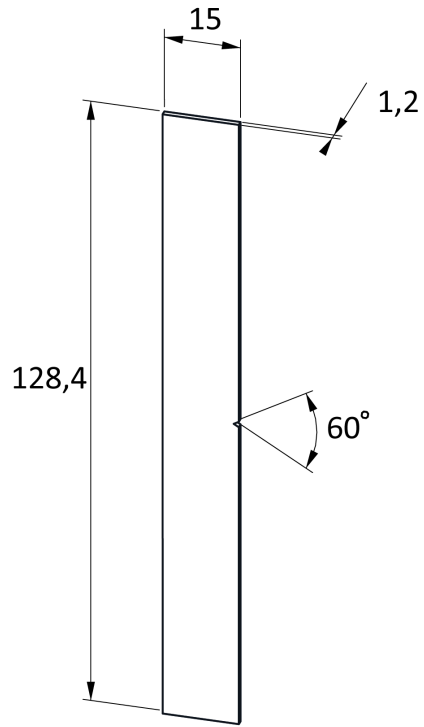
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M.Sadek_paper_for_fatigue&fracture_of_engineering_materials&structures.pdf available at <https://authorea.com/users/298846/articles/428164-comparison-of-different-procedures-for-computing-the-stress-intensity-factor-range-for-fatigue-crack-growth-testing-at-20-khz>

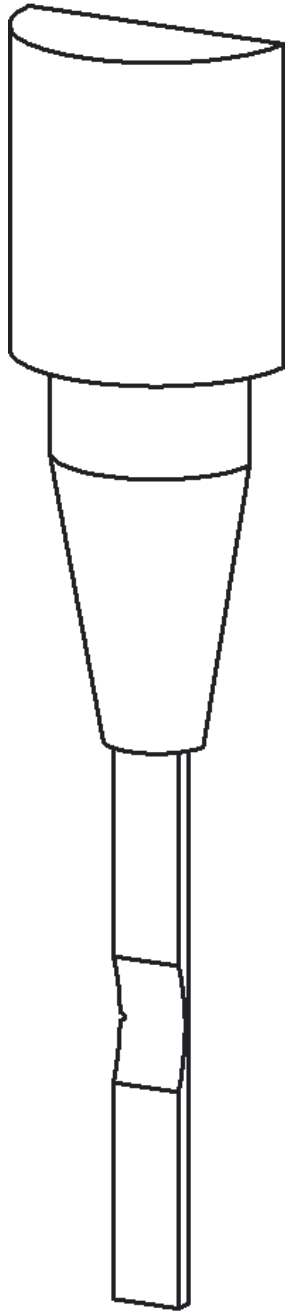




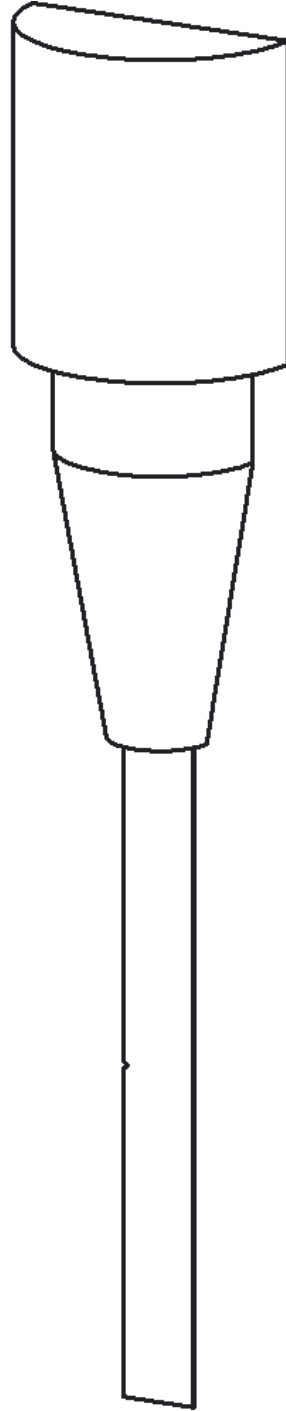
a)



b)



a)



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