

SIMULATION USING ACOUSTIC EMISSION ON QUASI-FRAGILE MATERIALS EMPLOYING THE METHOD OF DISCRETE ELEMENTS FORMED BY BARS

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Abstract. The utilization of acoustic emission techniques to determine the level and location of damage in structures is a topic of great technological interest at different types of materials and structures. This technology is used in industrial plants, pressure vessels, piping and historic buildings for monitoring the damage progress. This technique is also applied for study of the fracture process of new materials. For analyze of results simulations in acoustic emission are applied numerical methods that capture internal phenomena of rupture and can be of practical importance to aid of the interpretation of results. The version of the DEM used in this work discretize the continuous in regular discret cubic elements, locating the masses at the nodes and considering that the bars have an similar stiffness of the continuum. The energy balance is used during the fracture simulation for represent correct way the progress of damage and final failure of the structure analyzed. Global indices are commonly used to evaluate the acoustic emission tests calculated with the simulated results. The control of energy balance and the damage process that happens in the simulation are used as a tool in the interpretation of the relationship between acoustic emission signals and the real damage evolution. The discussion of these aspects is performed at work.