

# NUMERICAL BEHAVIOUR OF AL6063 UNDER VARYING STRIKER VELOCITY AND LENGTH OF SPLIT HOPKINSON PRESSURE BAR AT LARGE STRAIN RATES

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## ABSTRACT

The high strain rate characterization of materials has always been a very important to know the exact behaviour in dynamic conditions such as blasts, earthquakes, projectile penetrations, crashworthiness of vehicles, bullet proof armours. These high strain characterizations can be studied using experimental technique such as Split Hopkinson Pressure Bar Test. These experimental techniques are very costly and difficult to conduct. However, the behaviour of materials under dynamic loading can be performed under high strain rate using finite element simulation of Split Hopkinson Pressure Bar (SHPB) Test. The numerical simulations of Al 6063 under various conditions under dynamic range are performed using ABAQUS/Explicit 6.14. A three dimensional model of SHPB system is developed in ABAQUS to understand the effect of parameters. Each component of SHPB system is created separately in ABAQUS/CAE and subsequently assembled. To understand the effect of length, striker bar's length is varying from 200 to 400 mm while its diameter is kept constant as 20 mm. In addition, impact velocity is also varied from 20 to 30 m/s to see the effect under large strain rates. The test specimen's dimensions are also of varying diameter to understand the aspect ratio effect under dynamic conditions. Results revealed that the amplitude of the wave is directly proportional to the striker bar velocity as the velocity increase the amplitude of the wave increases for the parameters considered in the present investigation. Striker length also affects the flow behaviour of specimen.

**Keywords:** Finite element analysis, Dynamic behaviour, Split Hopkinson Pressure Bar, Al6063, Aspect ratio.

