

Laboratory Static and Dynamic Test of Garford Hybrid Bolts

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ABSTRACT:

In order to determine the dynamic capability of a Garford hybrid bolt, static and dynamic tests were performed at the Videx Mining facility in South Africa. Two hydraulic rams with a capacity of 300kN and a total displacement of 300mm were used to determine the static performance of the bolt. The operation of the hydraulic rams was accomplished using an electric pump. The electric pump was used from the initial phase of loading until the bolt reaches specimen fails, or the rams reach their stroke capacity (300mm). On the other hand, drop tests were performed using known mass from a known height dropped onto a plate connected to bolt specimen installed. The results of the study indicated that Garford hybrid bolts can withstand the maximum peak load of 217.95kN with a minimum peak load of 138. 18kN. This was achieved at a test time between 17.50 seconds to 21.40 seconds. Further analysis has shown that the bolt can achieve the energy absorption ranging from 22.06kJ to 22.21kJ at a velocity ranging from 2.90m/s to 3.28m/s.