

IMX-101 HE Loading of 155MM Projectiles

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The Armament Research, Development and Engineering Center (ARDEC) has been utilizing the state-of-the-art melt pour loading facility at Bldg 810, Picatinny, NJ to load 155mm projectiles with the IM fill IMX-101 in support of replacement fill for TNT. The TNT replacement program is being executed by the Program Manager for Cannon Artillery Systems (PM CAS). The IM loading of 155mm projectiles at Picatinny Arsenal supports this program by supplying loaded projectiles for IM testing to validate the IM performance characteristics and tactical requirements of the candidate replacement, IMX-101. The manufacture of TNT or IMX-101 loaded 155mm projectiles must be performed using a tightly controlled process and maintaining a strict adherence to process parameters and loading procedures in order to meet the stringent explosive cast quality specification requirements of artillery projectiles. PM CAS is working toward keeping the implementation of the IMX-101 into FY11 production and therefore, the typical time required for the development of a melt pour loading process need to be significantly reduced. The pilot plant melt pour loading facility at Picatinny Arsenal utilized unique data acquisition and analysis tools to deliver projectiles loaded with candidate replacement IM explosives with minimal process development time added to the overall program schedule.

Engineers at ARDEC, developed a data acquisition system that includes a custom designed thermocouple system that can be affixed to a specially design M107 or M795 projectile to monitor the solidification front of a cooling melt pour explosive. The thermocouples are integrated with a Model Based Control (MBC) system that, which provides invaluable information enabling engineers to adjust process parameters based on real time data rather than after the fact x-ray data. This data results in the ability to significantly reduce the time required to develop melt pour loading parameters that meet the cast quality requirements.