

Development of Manufacturing Capability for Primary Explosives



PERIOD OF PERFORMANCE:
October 2015 to December 2022

PLATFORM:
Energetics / CAD/PAD Devices

CENTER OF EXCELLENCE:
EMTC

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STAKEHOLDER:
PEO U&W, PMA-201

TOTAL MANTECH INVESTMENT:
\$1,500,000

A2708 — Primary Explosives Manufacture

Objective

Many currently fielded military programs were developed 20-30 years ago. As such, these programs are continually faced with material obsolescence issues where current qualified suppliers have discontinued products or product lines. In most instances, the materials that are being discontinued are not available from alternate domestic suppliers, and it is necessary for alternate materials and/or sources to be identified to perform the same or similar function as the material being replaced.

Primary explosives are required as initiators or detonators for virtually every system involving energetic materials. They are typically quite sensitive to impact, friction, and temperature, etc. and used in small quantities to initiate explosives or propellants in everything from small arms to missiles and bombs. Many of the specialized primary explosives are used in cartridge actuated devices (CADs) to transmit a signal to a remote component, sequence events during an ejection, push a piston, eject a bomb, unlock a seat belt, actuate a fire extinguisher, cut and release, etc., as well as in propellant actuated devices (PADs), small rocket motors used for propulsion (e.g., propelling an ejection seat out of an aircraft).

This Energetics Manufacturing Technology Center (EMTC) project's objective is to develop the manufacturing capability for several critical primary explosives to ensure a continued Continental United States (CONUS) availability is being undertaken at Naval Surface Warfare Center Indian Head Division (NSWC IHD).

Payoff

Development of a manufacturing capability for critical primary explosives will ensure continued availability of these qualified materials. CONUS commercial sources for diazodinitrophenol (DDNP), lead mononitroresorcinate (LMNR), potassium dinitrobenzofuroxan (KDNBF), and barium styphnate either cannot meet the current annual requirement or no longer exists. Providing qualified sources of these materials will allow for continued sustainment of critical man-rated systems, such as those provided by the tri-service CAD/PAD Joint Program Office (JPO).

Implementation

The CAD/PAD JPO (PMA-201), as the single manager for CAD/PAD devices used in all DoD components, recognizes the negative impact of the inability and difficulty of procuring these materials. The CAD/PAD JPO endorses this ManTech project to advance the manufacturing methods for these primary explosives and will resource the evaluation and qualification of the new material in CAD/PAD applications.

DDNP, LMNR, KDNBF, and barium styphnate are primary explosives widely used in ordnance systems as components in explosive initiation trains. The primary applications are in cutters, squibs, and other CADs and PADs. DDNP is used in percussion caps and detonators; KDNBF is used in squib switches for missile systems; LMNR is used in Bellows motors and the MK 112 squib switch; and barium styphnate is used in semiconductor bridge ignitors for activation of thermal batteries.

