DEMILITARIZATION BY INDUCTIVE HEATING MELTOUT (DIHMEs)

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EL DORADO ENGINEERING
SALT LAKE CITY, UTAH
KEY PLAYERS

- DEFENSE AMMUNITION CENTER
- CRANE NSWC
- EL DORADO ENGINEERING, INC
- AJAX TOCCO MAGNETHERMICS
- SAFETY MANAGEMENT SYSTEMS
- UNIVERSITY OF MISSOURI, ROLLA
PHASES OF DEVELOPMENT

- PRIMARY COMPONENTS
  - DESIGN MOST IMPORTANT ITEMS FIRST
  - DON’T LET PROJECT GET BOGGED DOWN WITH COMPLEXITY OF THE ENTIRE SYSTEM
  - ABLE TO SIMPLIFY PROCESS

- PRIMARY COMPONENTS TESTING

- SECONDARY COMPONENTS

- FINAL INSTALLATION AT HWAD

- FURTHER DEVELOPMENT AFTER PRODUCTION HAS STARTED
PROCESS DESCRIPTION

- M49A2, M49A3 & M49A4 60MM MORTAR ROUNDS
- CLASS I DIV. 1, CLASS 2 DIV 1 HAZARDOUS OPERATION ROBOT
- WATER JET CUTTING STATION
- INTERIM/FUZE DEPOSITION STATION
- INDUCTION HEATING STATION
TEST CELL AT CRANE
NSWC LAYOUT

- PRIMARY COMPONENTS ONLY
- SECONDARY COMPONENTS WILL BE ADDED AT HWAD
TEST CELL LAYOUT AT CRANE NSWC
EXPLOSIVE PACKAGING REQUIREMENTS

- FUZE DROP ANALYSIS
  - MUST PASS 5 AND 40 FOOT DROP TESTS PER MILITARY STANDARD 331C
  - FUZE HAS SEVERAL DESIGN FEATURES TO PREVENT INITIATION.

- TWO CUTS VERSUS ONE CUT
  - FOUND THAT FIN END OF MORTAR BODY DID NOT NEED TO BE CUT OFF TO GET EXPLOSIVE SLUG TO FALL OUT
COIL DEVELOPMENT

- Uniformly heat mortar body to 300 deg F plus or minus 25 deg F
- Coil must be shielded to ensure arcing doesn’t occur
- Minimum standoff distance must be maintained at all times
- Explosive slug cannot exceed 300 deg F
- Electronic circuitry must be protected from explosive vapors and dusts
FINAL COIL DESIGN
ROBOT & END EFFECTOR REQUIREMENTS

- PICK UP 4 MORTAR BODIES & 4 SEVERED FUZES
- WEIGH AROUND 35 POUNDS
- FAIL IN HOME POSITION
- OPERATE IN HAZARDOUS ENVIRONMENT
WATER JET CUTTING STATION

DEVELOPED BY UMR UNDER SEPARATE CONTRACT
SIMULATED WATER JET CUTTING STATION

- Cylinder
- Chuck Assy
- Mortar Body
- String
- Fuze
- Severed Fuze Catch Basket
INTERIM/FUZE DEPOSITION STATION

- DUMPING MECHANISM
- MORTAR SUPPORT
- PROXIMITY SENSOR
- ROTARY ACTUATOR
- SEVERED FUZE COLLECTOR
INDUCTION HEATING STATION

- Grippers
- Pyrometers
- Coils & Shields
- Griper Slide Mechanism
- Slide Table
- 25 kW Transformers
INDUCTION HEATING STATION SUPPORT EQUIP
CYCLE TIME

- Cycle time varies with life of water jet cutting operation.
- New cutting orifice cutting time is around 83 seconds.
- Worn cutting orifice cutting time is around 99 seconds.
EQUIPMENT PICTURES
PICTURES CONT.
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WHERE WE ARE AT

- CURRENTLY FINISHING FABRICATION
- STARTING INERT TESTING MAY 15, 2007
- SHIPPING TO CRANE NSWC AROUND JUNE 1, 2007
- LIVE TESTING AT CRANE NSWC LATE JUNE
- WHEN TESTING IS COMPLETE, SHIP TO HAWTHORNE ARMY DEPOT