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Ultraviolet (UV) Curable Coatings for Bullet Tip Identification
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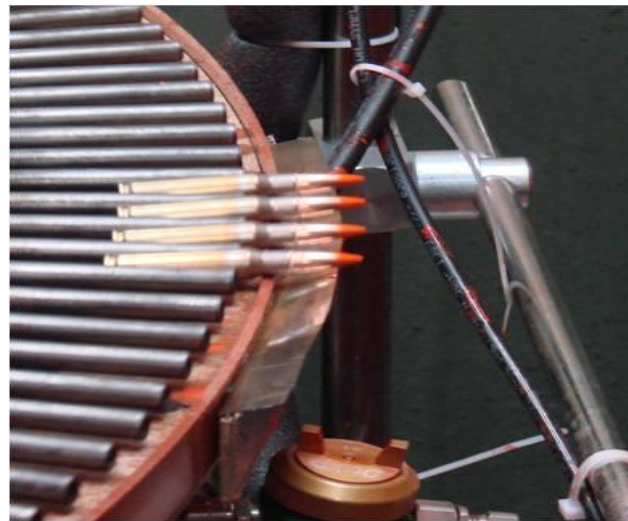
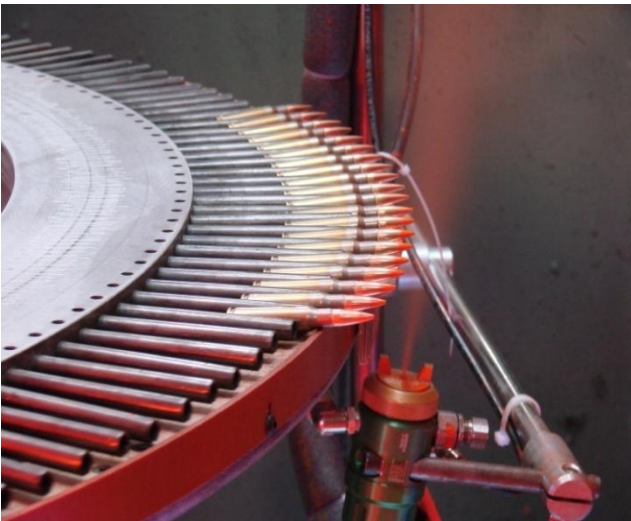
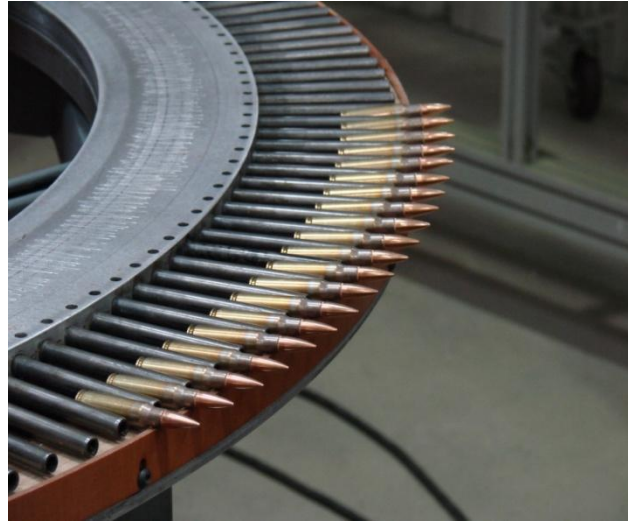
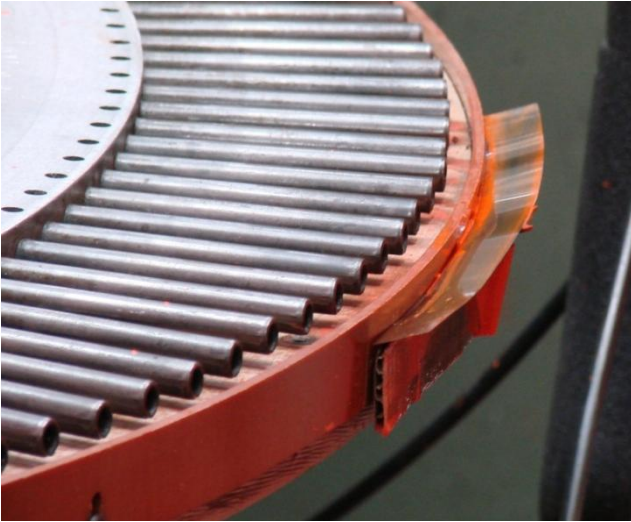
Background

- The Sustainable Painting Operations for the Total Army (SPOTA) Program was initiated in anticipation of impending National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations such as the Defense Land Systems and Miscellaneous Equipment (DLSME).
- Although munitions coatings will likely be exempted from the DLSME NESHAP, environmental stewardship in this arena can be beneficial.
- Past Case Mouth Waterproofing (CMWP) efforts to reduce Hazardous Air Pollutants (HAPs) resulted in higher reject rates in production.
- Combining bullet tip identification (ID) with the CMWP process can reduce handling and production time, thus reducing the risk of damage during processing while increasing throughput.

Approach

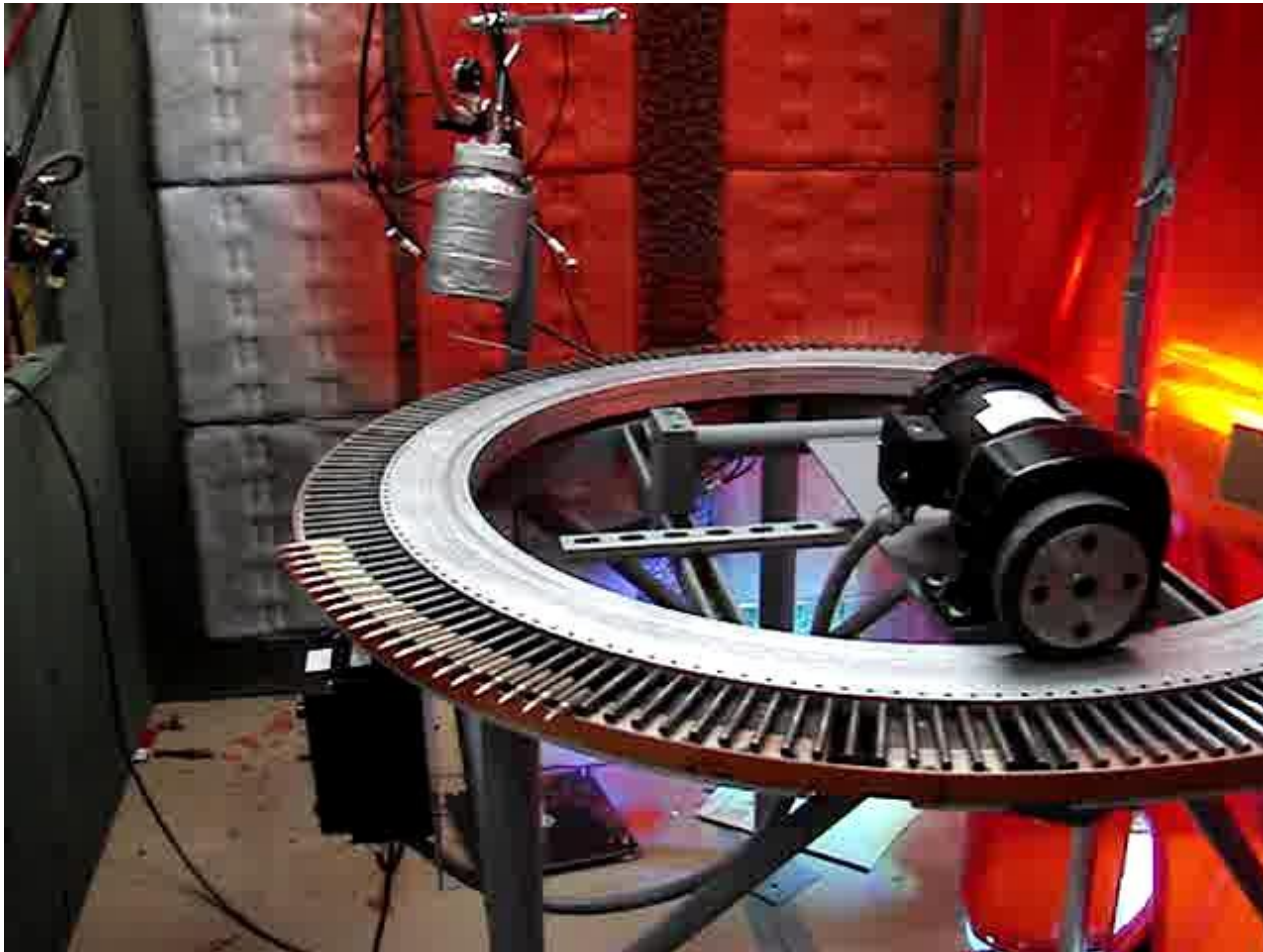
- Coordinate with Armaments Research, Development and Engineering Center (ARDEC), Program Manager – Maneuver Ammunition Systems (PM-MAS), and Lake City Army Ammunition Plant (LCAAP) operating contractor to incorporate bullet tip ID efforts into the existing external CMWP development
- Identify ultraviolet (UV) curable coatings as candidate alternative material
- Develop test plan to document evaluation criteria based on relevant drawings, specifications, and processing data
- Execute test plan to determine spray feasibility of UV coatings in this capacity

Application Elements



The Team used a spray shield to control the application of UV curable coatings on 7.62mm bullet tips. As bullets passed by the application point, a spray nozzle was activated, allowing the bullets to be coated as they rolled on the rotary table.

UV Coating Application



Successes and Benefits

- Established proof of concept of UV curable Tip ID coatings
 - UV coatings are HAP-free
 - Dry time is reduced from minutes to seconds
 - A process step is eliminated if coupled with CMWP
 - No queuing required
 - Less material handling
 - Less potential damage to CMWP
 - Smaller footprint
 - Color changes are faster versus dip application of baseline material
 - Process flow is increased, helping LCAAP meet DoD ammunition production needs
- Identified multiple potential vendors of UV curable tip ID coatings
 - Competition will exist in procurement process
 - Potential market changes will not affect availability

Accomplishments

- Spray applied UV curable coatings to 7.62mm bullets using same material handling equipment projected for use in external CMWP application to establish proof of concept:
 - No significant reformulation efforts; materials used were suppliers' first offerings
 - Performed laboratory evaluations of 6 coatings to compare with baseline material
 - Subjected coated bullets to rough handling in LCAAP process equipment
 - Identified 2 coatings that performed well through all testing – minor reformulations could increase the number of potential alternatives.

Conclusions

- Tip-ID of 7.62mm bullets is achievable with the use of UV curable coatings using the same material handling equipment projected for use in external CMWP application.
- Spray application alone is not efficient. Recycle system with spray application or alternative application system could increase benefit to LCAAP.

Path Forward

- Evaluate efficient application processes
- Validate spectrum of colors to produce all small caliber products
- Complete integration into CMWP process
- Implement into production

Project Stakeholders

- Program Manager – Maneuver Ammunition Systems (PM-MAS)
- Armaments Research, Development and Engineering Center (ARDEC)
- Lake City Army Ammunition Plant (LCAAP)
- Alliant TechSystems (ATK)

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