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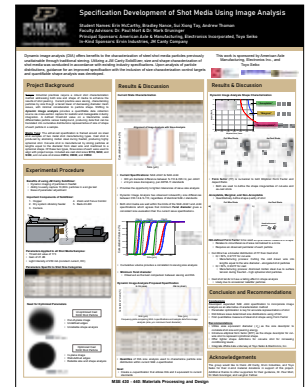
Purdue University School of Materials Engineering

Specification Development of Shot Media Using Image Analysis

A RECENT POSTER SESSION was the culmination of a senior research project for engineering students at Purdue University. The participating students are Erin McCarthy, Bradley Nance, Andrew Thoman and Sui XiongTay. The research project was sponsored by American Axle & Manufacturing, Electronics Incorporated, and Toyo Seiko.

Project Introduction

Dynamic image analysis (DIA) offers benefits to the characterization of steel shot media particles previously unattainable through traditional sieving. Utilizing a JM Canty SolidSizer, size and shape characterization of shot media was conducted in accordance with existing industry specifications. Upon analysis of particle distributions, guidance for an improved specification with the inclusion of size characterization control targets and quantifiable shape analysis was developed.



Conclusions

Developed expanded SAE J444 specification to incorporate image analysis as an alternative characterization method

- Parameter optimization is key for accurate representations of shot
- DIA follows sieve determined size distributions using xFmin
- First quantitative measure of steel shot shape using Form Factor

Recommendations

- Utilize area equivalent diameter (X_A) as the size descriptor to correlate shot size and peening energy
- Introduce elliptical form factor (EFF) as the shape descriptor for cut-wire shot to represent cylindrical shape
- Offer tighter shape definitions for cut-wire shot for increasing conditional levels
- Integrate offsite data underway at Toyo Seiko and Electronics Inc.

Acknowledgements

The group would like to thank JM Canty, Ervin Industries, and Toyo Seiko for their in-kind material donations in support of this project. Additional thanks to other supporters for their guidance: Dr. Paul Mort, Dr. Mark Gruninger, and Langdon Feltner.

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