The results of comparison (1) are shown in Table 4. CW20 shot from China has a significantly different minimum feret diameter and EFF when compared to the other two facilities. For CW28, Poland and Mexico have significantly different means for all parameters except EFF. For CW32, Mexico and China have significantly different means for AR and EFF.

### Results & Discussion

#### FEA Models

Stress profiles of each model were constructed by measuring the average residual stress across paths at different depths from the deformed Almen surface, like the one shown in Figure 5. Figure 6 shows the resultant stress profiles for each model.

The stress profiles were integrated and fitted to Equation 1, a stretched exponential function of the energy stored in the impacted substrate. Figure 7 shows that models for Mexico Conditions 1 and 3 have outlying fitting parameters compared to the rest of the models. It is expected that models with smaller particles have shallower stress profiles. This is consistent with Mexico Condition 1 results, but no other models followed this trend. No correlation between particle size distribution and stress profile could be identified in the models. Models with many more particles, similar to physical peening, may have shown more significant results.

### Recommendations

- The shot diameters are significantly impacted by peening time. However, for future studies, shot condition should be analyzed based on amount of time shot has been used rather than the time between new shot additions, and more time divisions between Conditions 1 and 2 could be studied.
- Significant differences in shot characteristics between plants were observed, so more samples should be collected to see if the trends persist. Blockaging confounding factors, such as shot supplier, could also be beneficial.
- No conclusions regarding the source of peening time differences between plants could be made. Further analysis is needed.
- Future models should contain many more shot particles and a bulk gear substrate to be more realistic. Other parameters such as shot shape and substrate geometry should be considered.

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