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Discussion of the Physical Limitations of Additive Manufacturing CARLOS CASTILLO, MATTHEW DEUTSCH, SEAN MCCLAIN, ADELE POYNOR, Allegheny College — During 3D printing processing of complex parts, many processing defects, such as cracks, burr, and collapse appear easily in the scanning around the corner. To reduce the scanning defects of different angle corners, the thermo-mechanical coupling field of different parts were simulated and the thermal and stress cloud pictures were analyzed. The relationship among the machine tool's acceleration, the size of angle, the temperature of the corner, temperature gradient and thermal stress were gained. The simulation results show that the thermal stress of corners depends on the machine tool's acceleration and the angle of corners with both sides. The temperature results of simulation and the forming quality of the different angles of corners are verified by the experiment.

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