

# **Improvement on Downstream Cold Spray System and Innovative Nozzles**

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The commercial downstream powder feeding cold spray system has some unique advantages, such as low cost, compact and portability. However, it has some limitations due to its inherent low particle velocity and can only be used to deposit limited types of materials. We developed an improved downstream powder feeding cold spray system that substantially increases its particle velocity. Both simulation and experimental verification results proved that the improved system generates particle velocity that is much higher than the conventional downstream powder feeding cold spray system and approaches the results achieved by the upper-stream powder feeding system. In addition, by using our unique laser consolidation process, we successfully developed innovative nozzle design that produces much uniform coatings than the conventional nozzles.