NUMERICAL MODELING OF TWO PHASE FLOW FOR DIRECT METAL DEPOSITION

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Laser cladding is an effective method of production of various coatings including functional-gradient, multi-layer ones, plus it is a flexible way to produce the details of complicated geometry.

One of the main scientific and technological problem of technology is increasing the coefficient of the use of powder. Other important problems are increasing spatial resolution of material deposition and reducing the roughness of the cladded bead, protecting the optical elements of the laser nozzle head from the damage of hot powder particles.

The structure of gas-powder flows formed by the laser-cladding nozzle and the accuracy of focusing the jet of powder into the region of the melt created by the laser beam is of decisive importance of the tasks mentioned above.

In this work, physical and mathematical models of powder transportation by gas during laser cladding are discussed. A comparison of numerical modeling results and experimental data is presented.

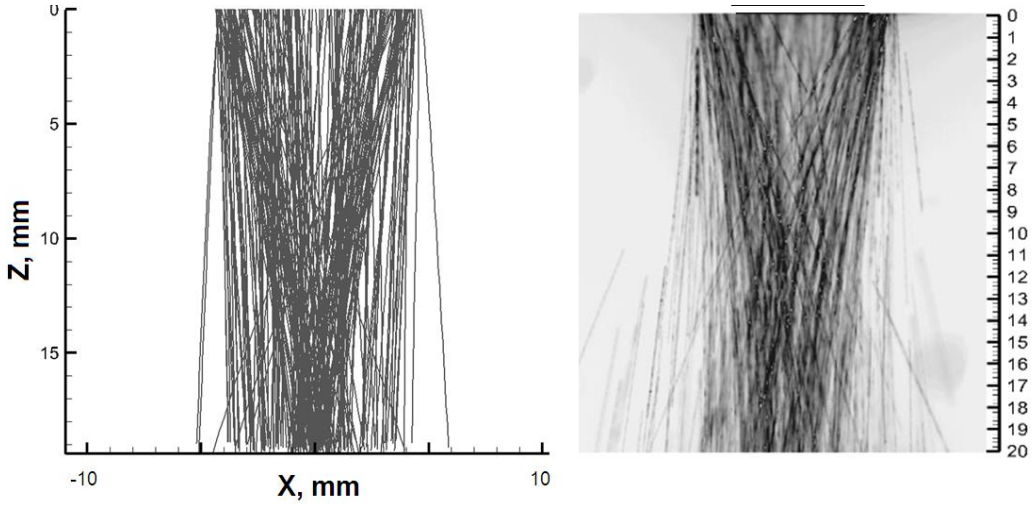

Figure 1. Comparison of particle tracks obtained numerically and experimentally [1].

References

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