

Research Programs

Development of Alternate SSM Aluminum Alloys

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It is interesting to note that a new process is usually evaluated utilizing existing alloys rather than optimizing the alloy to take advantage of the unique attributes of the process. Currently, conventional cast aluminum alloys 356 and 357 are being used for SSM process. SSM alloy development remains a significant issue in SSM processing where the residence time in the two-phase region, and the fraction solid of the primary phase as a function of temperature, are two critical parameters. The alloy constitution, and the sequence of phases, which precipitate out during the solidification journey are important variables. Alloy development in SSM processing has not been optimized, thus limiting the full potential of this new technology.

The aim of this project is to develop alloys that are better suited for SSM processing. In order to achieve the goal, the following strategy has been followed.

- Use ThermoCalc and Dictra thermodynamic modeling packages together with an aluminum alloy database to determine phase equilibria for SSM alloys.
- Identify desired characteristics of an ideal SSM alloy.
- Use thermodynamic model to optimize the composition of current commercial SSM alloys, and develop new alloys with ideal characteristics.
- Carry out plant tests on new alloys through collaboration with ACRC consortium members. Feedback is evaluated, and alloy development is further optimized.