CHAPTER 6

CONCLUSIONS AND FUTURE SCOPE

6.1 SOME MAJOR CONCLUSIONS OF THE PRESENT STUDY ARE AS FOLLOWS:

1. Slag–sand mold was successfully prepared with the variation in the 30%-70% of slag using the CO_2 molding process. Mold properties of the sand improved remarkably with the partial replacement of sand by blast furnace slag and ferrochrome slag in a sand mold. The variation of CO_2 gassing time (5sec-20sec) shows the optimization of mold properties due to the declination of the mold properties at 20 sec. The declination can be due to the weakening bond strength at more exposure to CO_2 gas.
2. There was no sign of mold metal reaction as the utilization of slag as a mold ingredient. Also, through XRD analysis, diffraction peaks of A319 cast in different molds has similar characteristics.
3. The solidification rate of A319 alloy cast in slag mold is higher as compared with sand mold. Microstructural examination exhibits small SDAS of A319 alloy cast in slag mold as compared with sand mold. The porosity percentage of A319 alloy cast in red mud-sand mold is higher as compared to the rest of the mold.
4. The slag-sand cast alloy displayed better mechanical properties (ultimate tensile strength, yield strength, and hardness) with respect to the conventional as-cast alloy. The enhancement in properties was progressive with increasing wt.% of slag in a sand mold. The lowest wear rate and lowest coefficient of friction are obtained for blast furnace and ferrochrome slag mold cast at low load and frequency, which also state the feasibility of slag as mold materials.
5. The finding is very helpful to widen the utilization of solid waste as a mold material in foundry industries.

6.2 FUTURE SCOPE:

- As the casting of non-ferrous alloy in slag mold was successful, it would be really interesting to investigate the casting of ferrous alloy in slag-sand mold.
- Effect of heat treatment on the slag-sand mold properties and understanding the mold-metal reaction of heat-treated mold.
- In this investigation, the cast A319 performance was addressed in terms of microstructural features, mechanical and tribological behaviour only due to time constraints and hence it may be further extended for fracture toughness, flexural strength, fatigue strength, etc. also, and compared with sand mold.
- Assessment of an environmental impact to determine the air emission from foundry as the utilization of industrial solid waste.