CHAPTER 6

CONCLUSIONS AND SUGGESTIONS FOR FUTURE SCOPE

6.1 CONCLUSIONS

On the basis of present study, it can be concluded that:

1. White cast irons based on Fe-Mn-Cr-Mo system are applicable for use in the place where corrosion resistant cast irons are required.
2. Better corrosion resistance, shown by the specimens heat treated from elevated temperatures, is due to austenitic matrix added with less volume fraction of massive carbides.
3. High hardness less strength and lower resistivity against corrosion of the as cast alloys are due the microstructure constituting austenite, martensite and massive carbides.
4. Microstructures comprising of spherical and needle like carbides in addition to martensite, austenite and massive carbides attained in the specimens heat treated from lower temperatures are undesirable.
5. Absence of spherical and needle like carbides improved the properties.
6. It is a unfeather dispersed temperature ranges over which the different microstructures exist are given below:
   Volume fraction of massive carbides decreases with increase in temperature or period at a given heat treating temperature. The decrease was marked at temperatures at or above 950°C.
7. Massive carbides were prepared discontinuous on heat treating from a temperature more than 900°C.
8. Massive carbides shows rounding off behavior when heated on a temperature higher than 900°C.
9. The volume fraction of massive carbides is lowest at 1000°C, 10 hours heat treatment. Dispersed carbides coarsen with temperature and get dissolved at higher temperatures, above 950/1000°C
10. M₃C, M₇C₃, and M₅C₂ type carbides are present the alloys.
11. The massive carbides are mostly $M_3C$ and $M_7C_3$ type.
12. Dispersed Carbides and needle like carbides are of $M_3C$ and $M_5C_2$ type.
13. $M_3C$, $M_7C_3$, and $M_5C_2$ carbides are present in all as-cast alloys and are stable up to $850^\circ$C.
14. $M_7C_3$ and $M_5C_2$ carbides are stable up to $1000^\circ$C.
15. Hardness is minimum at $1000^\circ$C.
16. For a given heat treating temperature, hardness varies with the soaking period.
17. For a given heat treatment time, hardness varies with the heat treatment temperature.
18. The compressive strength improves on heat treating.
19. Corrosion rate in the as-cast condition is consistent with its Microstructure. It in general, decreased with an increase in the heat treating temperature/soaking duration and also with an increase in Cu content (i.e. while moving from alloy A1 to A3) due to enhanced stability and a larger volume fraction of austenite and simultaneous decrease in the Vf MCs; the exceptions are those heat treatments which produce adverse microstructural feature namely matrix heterogeneity, and aliened DCs.
20. This present study can be used in marine engineering for less corrosion in saline water contains 5-6 % Nacl.
21. The effect of dispersed second phase on corrosion resistance depends on their size, shape and distribution, In the present study dispersed particles affected the corrosion resistance adversely to some extent as is seen on heat treating from 900 and 950$^\circ$C, Heat treatment $1000^\circ$C, 10 hour, AC provided the best corrosion resistance and most useful deformation behaviour.

6.2 SUGGESTIONS FOR FUTURE WORK

The future work should be carried out on the following lines:

1. This study can extend to know the properties of hardness with using formation of needles at lower heat treating temperature.
2. White cast iron can be enhanced to composite material.
3. This research work can be extend to machining optimization with optimization tools Taguchi, RSM etc.
4. We can extend this work with optimization techniques.