V. CONCLUSIONS

The main results can be summarized as follows:

1. Upon reheating, the critical temperature for starting of grain coarsening was observed at 1100°C , beyond this point austenite grain started to grow more rapidly. This effect is supposed to be due to dissolution and coarsening of precipitate particles. Holding time at constant reheating temperature has relatively less effect on grain coarsening behaviour, when compare to effect that comes from reheating temperature.

2. Austenite grains of larger size after reheating can be refined to smaller grain size through recrystallization process by deformation in recrystallization region. The recrystallized grain size decreases with increasing amount of deformation in range of applied reduction.

3. Deformation at temperature of 860°C, which is regarded as nonrecrystallization region increases significantly the ferrite nucleation site. The ferrite nucleation site, expressed as effective nucleation area, Sv (grain boundary area plus deformation bands), can be calculated from experimental results. Increasing amount of deformation in nonrecrystallization results in the increase of Sv value for used temperature and strain parameters.

4. Optimizing the coiling condition was conducted to produce substantially the grain refinement and precipitation strengthening effect. The lower coiling temperatures yields the finer ferrite grain size and consequently the increase of strength of steel. Yield strength has a maximum point at 550°C due to precipitation strengthening effect.