Chapter VI

CONCLUSION & RECOMMENDATION

6.1 Conclusion

The study emphasized on the effects of agglomeration processed by fluidization. The PFD was employed as particleto be agglomerated and gasoline as the wetting agent for PFD. The experiment has been conducted by vary the PFD particle size, feed rate and gasoline amount, to find how the agglomeration occured, how the variables related to each ather, what factors provided good condition, what depressed the agglomeration and the efficiency of fluidization. is also determined. Since there is no special literature that records the experiments about agglomeration by fluidiziation, so it is difficult to evaluate the result. The results of the experiment are concluded as follows:

1. The number of agglomerates abtained is seemed to vary directly and linearly with the amount of gasoline used
2. The relationship among parameters for agglomeration is believed to be

   $$N = f\,(C,\ 1/F\ ,\ 1/d_p\ )$$

   and N relates to the group of $\frac{C}{Fd_p}$ linearly with the of 0.1583 with $\pm$ 42% deviation
3. The low feed of PFD and high amount of gasoline provide more agglomerates and the gasoline amount more than 300 ml/5min afforded good pattern of agglomeration.
4. Particle size of 0.51 cm. provides best agglomeration with the efficiency of 0.44% occurred by using gasoline about 104 ml/min. with feed rate = 6.6 gm/min.
5. The momentum flux distribution by fluidizing air on the particle surface increased while the pendular strength in agglomerates decreased with the increasing particle size

6. Momentum of collision depressed the agglomeration mechanism.

All the results concluded have been based on the experimental equipments. Data obtanied and many assumptions might not be suitably applied for other equipments or processes, one should make decision by consuming sufficient informations.

6.2 Recommendations.

Further investigations for the study of agglomeration of particle by fluidization was quite necessary for there are several unknown still unidentified such as the velocity of particles in the operating fluidizing bed, the rate of dissolving of polystyrene by gasoline, measurment of forces and momentum exerted by fluidizing air to the PFD, measurement of agglomeration strength, and so on.

It is recommended that

1. The distributor of fluidizing air should be redesigned to be able to supply uniform distribution at any air velocity.
2. The outlet port of PFD on the fluidized bed should be controlled proportionally and mechanically to the feeder which was controlled by the revolutions of a small tread conveyor.
3. The feeder of wetting agent which hereby a paint spray bottle was employed should be developed to other means that could supply continuous injection as long as needed because the spray bottle used in experiment could keep gasoline for at most 10 minute spraying.
4. It should be investigated whether there was any chemical reaction between the particles to be agglomerated and the wetting agent or between the particles and the fluidizing medium so that it might help the rate of agglomeration. In this experiment, the most suitable wetting agent was cyclohexane but it was so expensive that it could not be afforded and if it was used, a recovery system for cyclohexane had to be designed and certainly increased the cost and complexity of experiment.

5. The longitudinal fluidize bed was not suitable for any pressurized process.
6. Multistage of fluidizing beds should be investigated in order to optimize the agglomeration process.
7. Round shaped geometry of fluidized bed should be applied most convenient because there are many records and studies in literatures.
8. Besides suspending the particles by the longitudinal fluidizing bed, one may employ a mechanically shaked bed that shakes upward by an angle of a certain degree of inclination with the flow direction and wetting agent is fed under the bed. The point to be noticed is the homogeneity control of gasoline fed through the bed, which is easy for narrow bed but difficult for wide bed.