

CHAPTER 5

CONCLUSIONS AND SUGGESTION

Conclusions

Toner Cloud Beam, a new toner printing using the conductive toner was investigated. The conductive toners were charged by the electric field applied between the electrodes and moved through the control electrodes until reached the pulling electrode. The paper beneath the pulling electrode recorded this amount of toner and generated a toner dot. The size of the toner dot also depends on the amount of the toner particles that can pass through the control electrode.

From the simplified calculation model, when the voltage applied to the upper control electrode increases, the toner dot size increases.

According to the experiments, the toner dots could be obtained on various potentials applied to the upper control electrode. The results agree with the simplified model calculation in "on" condition. When the voltage applied to the upper control electrode increases, the toner dot size increases. This is because the toner passing area of aperture cross sectional increases. So the toner amount increases when the voltage increases. In a highly "off" condition, a dot is formed. This is considered that the negative toner charge is recharged at the lower control electrode and reaches the upper control electrode. The toner dots are obtained using two different sizes of aperture of the control electrode. When the bigger aperture was used, the area of toner dot is much larger than when the smaller aperture was applied. The behavior of toner powder in the presence of electric field was investigated through the electric field analysis and the simulation of toner trajectory.

The simulation provides the values of electric field, and potential distribution including observable toner movement. This simulation is a very valuable tool for studying the trends in the process of Toner Cloud Beam when adjusting the different parameters. (With small dimension and high speed in the process, it can be difficult to understand

what is really happening in TCB process.) Through the simulation, it is possible to observe the toner trajectory and study how the trajectory changes when parameters are changed.

Suggestion

Although understanding the electric field and potential distribution is advantageous for design and development of TCB, it is difficult to verify the absolute result from the simulation due to the complexity involved in particle shape and size distribution.

