show that the flipping maximum acceleration can reach 12m/s^2 in the start.

In order to reduce the flipping hydraulic cylinder start acceleration, the original hydraulic system is improved and shown in Fig. 8.

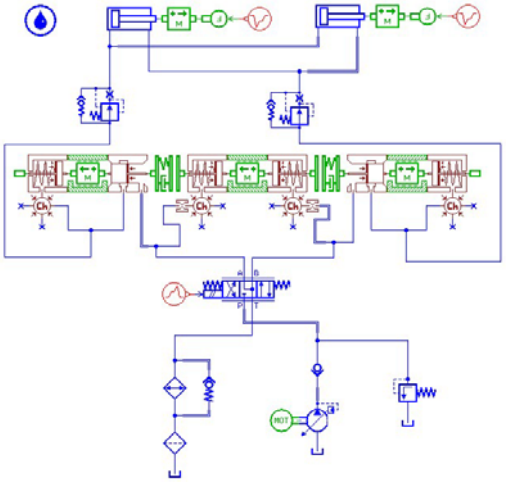

Fig. 8. Model of improved flipping control circuit simulation

The throttle valve is replaced by control valve to make the flow and speed more stable, and fluid control one-way valve is installed in oil circuit to balance circuit. The O-type electromagnetic directional valve is replaced by the Y-type electromagnetic directional valve to reduce commutation impact and to improve the lock effect of the actuator.

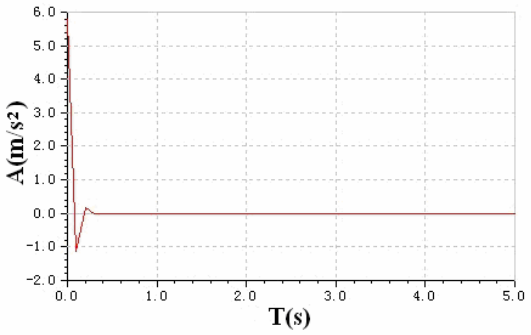

Fig. 9. Acceleration simulation curves of improved flipping hydraulic cylinder

Fig. 9 presents the acceleration simulation curve of the improved flipping hydraulic cylinder. The simulation results show that the acceleration of improved flipping hydraulic cylinder is reduced to 6m/s^2, and the impact has been reduced greatly. Therefore, the improved hydraulic system runs more smoothly, and has less noise of impact and vibration.

IV. EXPERIMENTS AND ANALYSIS

According to the principle of hydraulic system of mobile garbage compression equipment, an experimental system shown in Fig. 10 was established. The experiment results show the hydraulic system designed runs smoothly and can achieve the action requirements. The hydraulic system optimized can receive lower noise.

Fig. 10. Experimental system for mobile garbage compression equipment

V. CONCLUSIONS

In this paper, a new hydraulic system of mobile garbage compression equipment was designed according to its actual working conditions. The dynamic simulation analysis of the hydraulic system was realized with AMESim software. The main contribution of the paper is as follows:

A. Simulation results show that the designed hydraulic system can achieve the action requirements. The experiment also shows the similar situation.

B. In order to reduce the flipping hydraulic cylinder start acceleration, the original hydraulic system is optimized. The optimized hydraulic system runs more smoothly, it is verified with simulation and experiment.

These studies provide an important guiding significance to improve the stability of the hydraulic system of mobile garbage compression equipment and avoid noise nuisance.

REFERENCES

[1] X. M. Pi, Z. W. He, The design of hydraulic pressure system and PLC control system about the back-loading squeeze refuse collector, Machinery Design & Manufacture, vol. 8, 2006, pp. 123-124.

[2] D. Y. Hao, X. Y. Wang, T. Hou, Design of hydraulic system of back-loading compression refusec ollector, Special Purpose Vehicle, vol. 6, 2010, pp. 48-51.

[3] L. J. Dong, Y. L. Cao, The development of LT5170ZYS compression garbage truck, Commercial Vehicle, vol. 6, 2005, pp. 84-86.

[4] Y. L. Cao, L. J. Dong, Development of after- loading compression- type dust cart for the city, Equipment Manufactring Technology, vol. 3, 2009, pp. 155-156.

[5] Y. S. Fu, X. Y. Qi, Q. Li, LMS Imagine.Lab AMESim system modeling and simulation reference manual, Press of Beijing University of Aeronautics and Astronautics, Beijing, 2011.

[6] J. Y. Zhao, D. S. Zhang, W. C. Lu and C. Z. Yang, Design and experiment of hydraulic impact loading system for mine cable bolt, Procedia Earth and Planetary Science, vol. 1, 2009, pp. 1337–1342.

[7] C. B. Wang, Z. Yan, Simulating research on hydraulic system of hydraulic-pressure drilling machine on the basis of AMESim, Hydraulics Pneumatics & Seals, vol. 12, 2011, pp. 14-16.

[8] X. Y. Wang, X. X. Li, F. S. Li, Analysis on oscillation in electro-hydraulic regulating system of steam turbine and fault diagnosis based on PSOBP, Expert Systems with Applications, vol. 37, 2010, pp. 3887-3892.