center of gravity of container changes from -1396 mm to -121 mm, while the *Y*-coordinate changes from 2510 mm to 3147 mm.
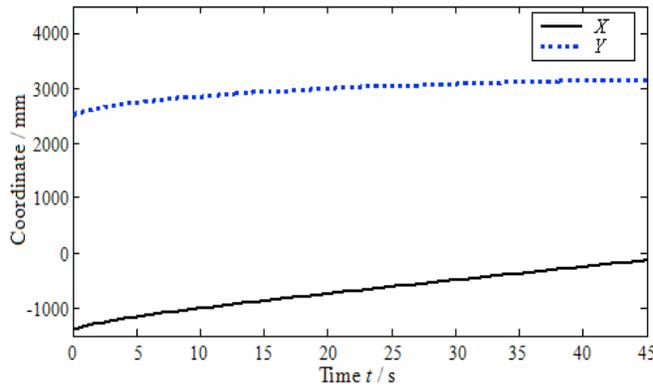

Fig. (11). Position curve of the center of gravity of garbage container.

During garbage dumping, the *Y*-coordinate of the highest point of the container (t upper left point) is shown in Fig. (**12**). For various working conditions, the highest point is found during garbage dumping. When the lifting cylinder stretches completely, the upper left point of the garbage container has the maximum *Y*-coordinate of 6028 mm. That is to say, the maximum height above the ground is 6028 mm.
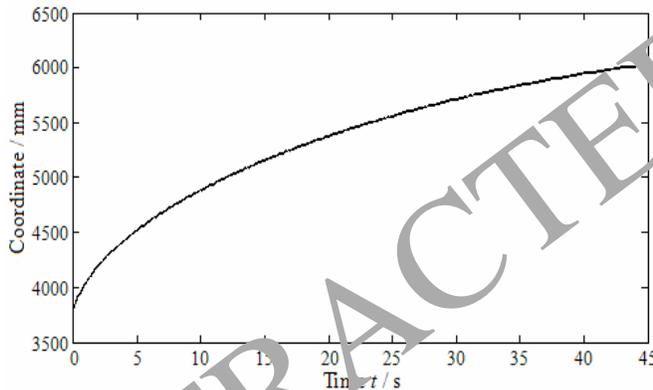

Fig. (12). *Y*-coordinate of the highest point of the garbage container.

The force acting on the lifting cylinder during garbage dumping is shown in Fig. (**13**). The maximum force of 5.4×10^5 N acting on the lifting cylinder occurs at the initial time during garbage dumping. The force gradually reduces to 8195 N as the lifting cylinder stretches.

CONCLUSION

(1)   The kinematic and mechanical models of the lifting mechanism are analyzed during the two stages of unloading and under the working condition of garbage dumping.

(2)   Using 20 T swing arm DCG truck as an example, the kinematics and force conditions of the lifting mechanism are calculated and analyzed.
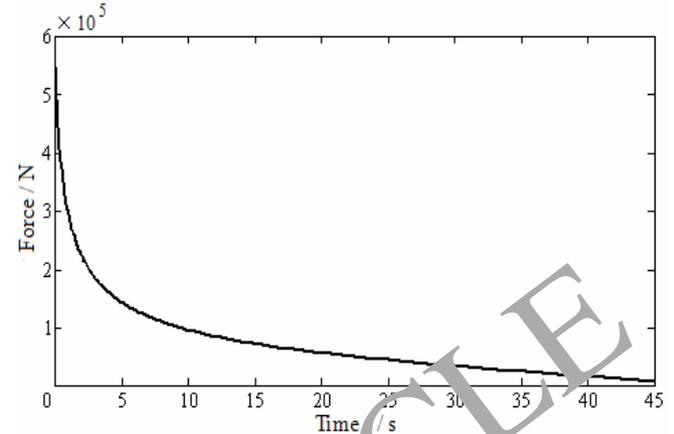

Fig. (13). Force curve of the lifting cylinder.

CONFLICT OF INTEREST

The authors confirm that this article content has no conflict of interest.

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