# Formability evaluation of double layer circular tube as a device with energy absorption capacity

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## ABSTRACT

Recently, earthquakes frequently occur in Japan. It is desired to promote seismic isolation technology of building. It has been found that newly designed composite material filled with low rigidity material to high rigidity material has significant energy absorbing capacity. However, it must have higher energy absorption capacity in order to respond to a large scale earthquake. Therefore, we have proposed an energy absorbing device with a double layer circular tube as a cell. In previous work, it has been shown that hysteresis occurs and absorbs the energy by friction that is generated between the outer layer and the inner layer. It is effective when inside shape of inner layer is defined as floral pattern. In this study, we considered to form the inner layer circular tube by forward and backward extrusion and to assemble with the outer layer circular tube at the same time. After forming, it is necessary to generate hysteresis around the entire circumference of the circular tube. Ideally, the inner layer circular tube is tightened to the outer layer circular tube. In this research, we aimed to know the contact condition between the outer layer and the inner layer. Therefore, the influence of the presence or absence of the outer layer circular tube on formability was investigated. As a result, there was a tendency for large elastic strain to remain at the contact portion between the circular tubes when the outer layer circular tube was set. This means that the outer layer circular tube hinders elastic recovery of the inner layer circular tube. Therefore, it was confirmed that the inner layer circular tube was tightened by the outer layer circular tube. The same result was obtained when the inner shape of the inner layer circular tube was a flower pattern.

## REFERENCES

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