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# Hysteresis in Sustainable Two-layer Circular Tube under a Lateral Compression Load

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**Abstract :** Recently, there have been a lot of earthquakes in Japan. It is necessary to promote seismic isolation devices for buildings. The devices have been hardly diffused in attached houses, because the devices are very expensive. We should develop a low-cost seismic isolation device for detached houses. We suggested a new seismic isolation device which uses a two-layer circular tube as a unit. If hysteresis is produced in the two-layer circular tube under lateral compression load, we think that the two-layer circular tube can have energy absorbing capacity. It is necessary to contact the outer layer and the inner layer to produce hysteresis. We have previously reported how the inner layer comes in contact with the outer layer from a perspective of analysis used mechanics of materials. We have clarified that the inner layer comes in contact with the outer layer under a lateral compression load. In this paper, we explored contact area between the outer layer and the inner layer under a lateral compression load by using FEA. We think that changing the inner layer's thickness is effective in increase the contact area. In order to change the inner layer's thickness, we changed the shape of the inner layer. As a result, the contact area changes depending on the inner layer's thickness. Additionally, we experimented to check whether hysteresis occurs in fact. As a consequence, we can reveal hysteresis in the two-layer circular tube under the condition.

**Keywords :** contact area, energy absorbing capacity, hysteresis, seismic isolation device
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