Universal Design

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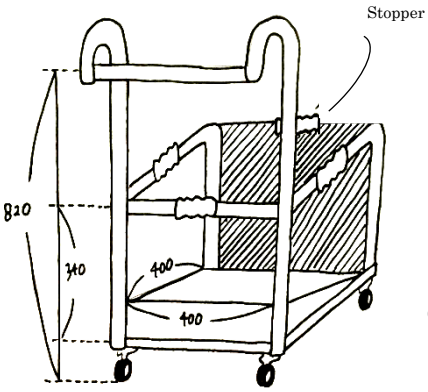
At First

We want to design something so even old people can live smoothly in an aging society. So this is our theme.

Design



(All units are “mm”)

*This design can be used when old people throw away garbage because many old people feel this is inconvenient according to a survey.

*This is usually used as a wastebasket, and it is used as a handcart when we carry a garbage bag.

*The side drown oblique lines can open because it has a magnet.

*The bottom of the box is a slope.

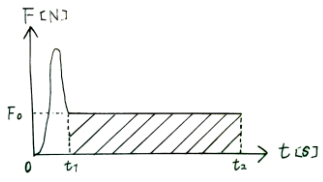
＊An advantage of using a handcart

We compare needed power(N･s) with a handcart and without a handcart when we carry a garbage bag, and show the advantage of using a handcart. We show it according to the following definition.

Power people push an object F(N)×Time t(s)＝An Impulse(N・s)

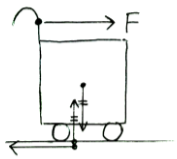
〈Without using a handcart〉

$F_0=4.0\times9.8=39N$

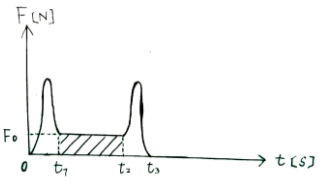


7.8×10^2 (N･s)

〈Using a handcart〉



$F_0=0.2\times(4.0+4.0)\times9.8=16N$



1.6×10^2 (N･s)

Therefore impulse when we don’t use a handcart is five times as large as the one when we use it.

The most important points on this plan are the angle and the material for the bottom. When we dump garbage, we slid the garbage or roll it. So, we adopted the least angle.

Method

Silicon’s frictional coefficient is big. Melamine resin’s one is small. We used a four-kilogram garbage which is the national average weight. We lifted one side of the board more and more. And we detected the angles at which the garbage fell.

Result

〈Silicon〉The garbage slid at 22°

〈Melamine〉The garbage slid at 11°

Consideration

Melamine resin is appropriate. We calculated it’s frictional coefficient from the result.

$mg\sin\theta - Fo=0$　　$N-mg\cos\theta=0$　　$Fo=\mu N$

So, $\mu=Fo/N=mg\sin\theta/mg\cos\theta=\tan\theta$

$=0.19$

The calculation result is in the range that is said a melamine resin’s frictional coefficient. Therefore 22° is accurate.

At last

•How does a handcart need weight not to fall when we deal our weight?

•How will we do if there are difference in level from our house to dumping ground？

We will discuss these topics.

Literature cited

•Mizuho-information-study-corporation

•TOKUSHUDENSO