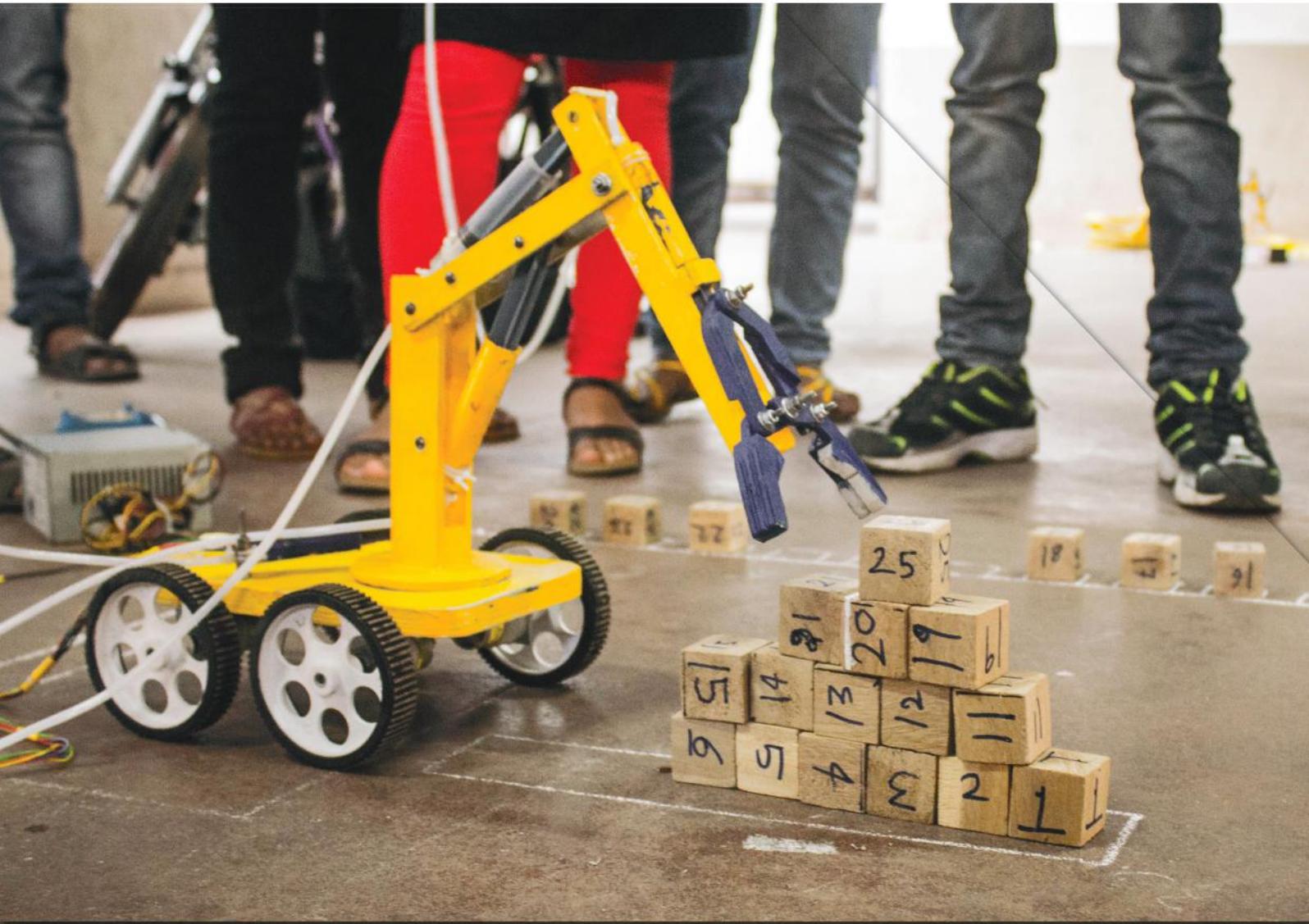# CIVIONICS

INTRODUCTION

Earlier, weights were lifted using pulleys, levers, block, tackles etc. These manual or mechanical methods of operation had several limitations. They also involved huge manpower and prolonged working hours for a facile job. As the population and technology increased exponentially, the demand for quicker and easier to operate equipment increased. To cater to this need, hydraulic machines were introduced.

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PROBLEM STATEMENT

This year, problem is to build a locomotive, mobile syringe actuated mechanical bot, capable of going upward on inclined ramps and scooping up loose aggregates placed at different places in the arena and dump them in the respective box. The Initial stage will have aggregates of size $2.36mm < S1 < 4.75mm$, the C1 box will have particles of size $4.75mm < S2 < 9.5mm$ and the C2 box will have particles of size $9.5mm < S3 < 13.2mm$. All the dimensions and the arrangement are shown in the figures below.

TASK

1. The bot will start from the Initial Stage.
2. The bot has to scoop and maximum possible amount of aggregates in the boxes placed in dumping zone from all the stages within the given time frame.
3. The scooped aggregates from each stage have to be dumped into the respective box.

SPECIFICATIONS FOR BOT

1. The dimensions of the base of the bot should not exceed 30 cm x 30 cm. However, there is no restraint on the height and weight of the bot.
2. The bot should function only on hydraulic forces except for the locomotion for which electronic components may be used (It can be wired or non - wired).
3. The participants will only be provided with 220 volts, 50 Hz standard AC supply, to be used for the locomotion of bot. Participants will themselves have to arrange for any other power supply required for their bot.
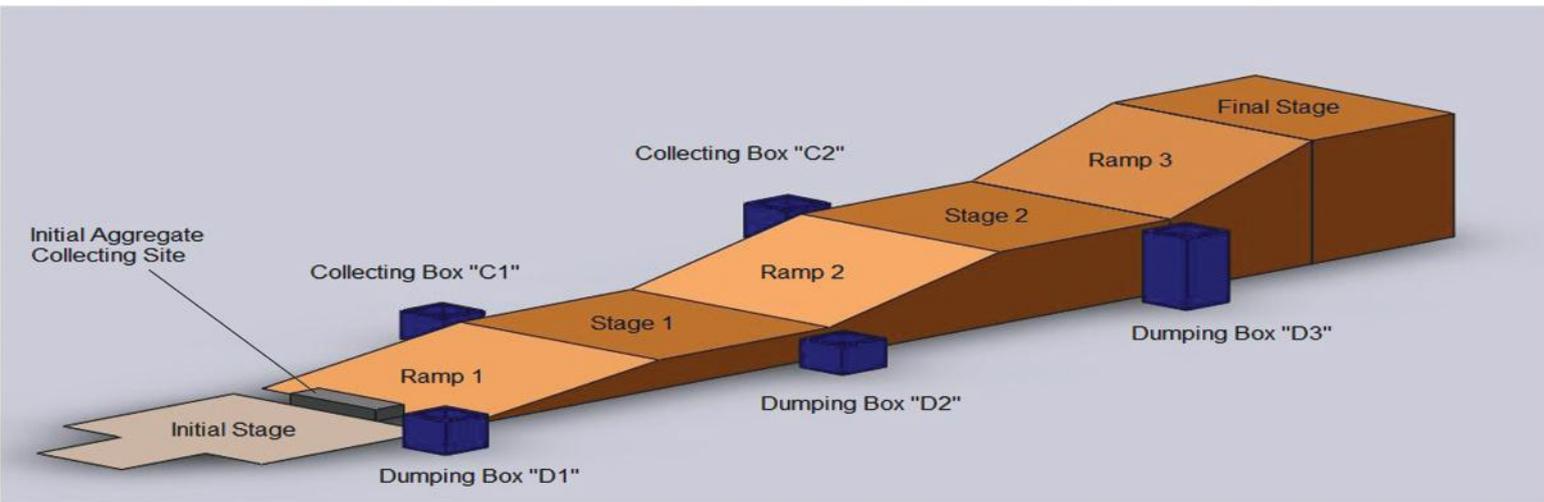
Side View:-
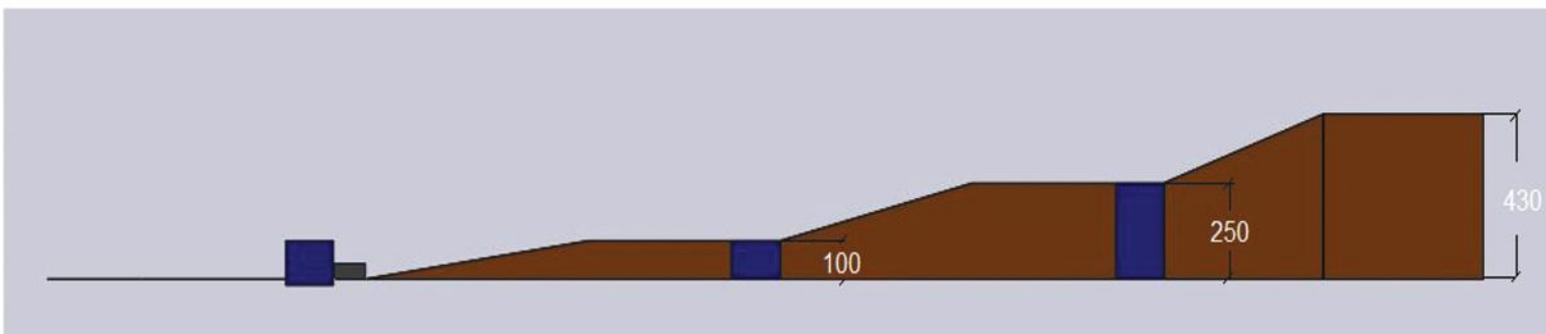
Top View:-
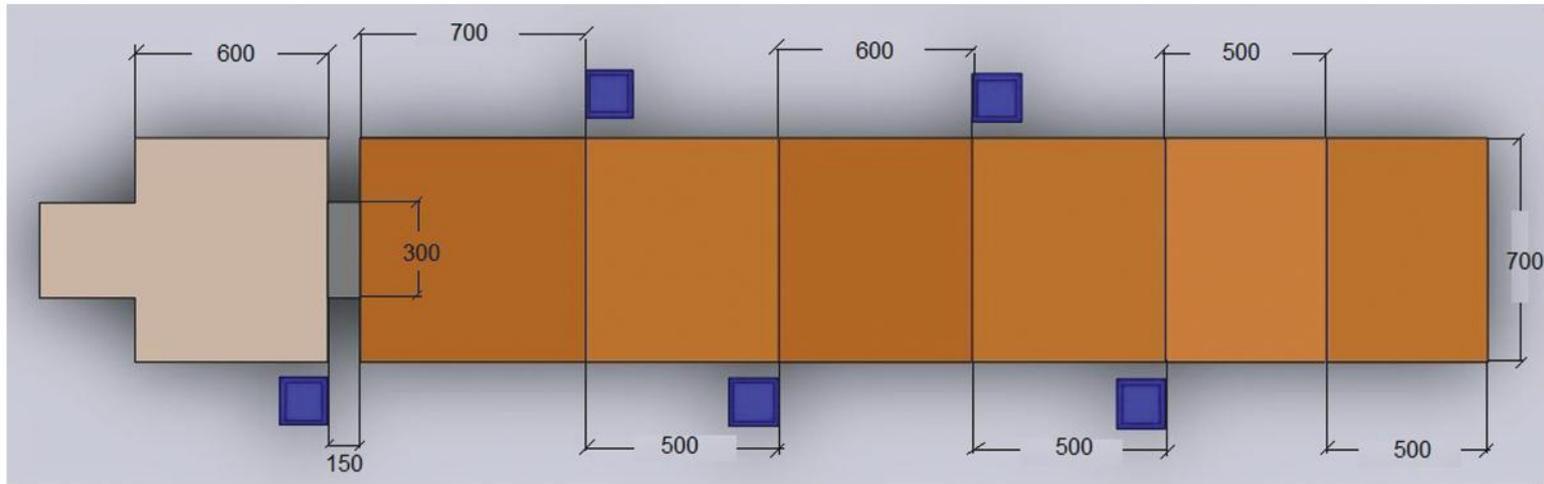
Isometric View:-

All the dimensions are in 'mm'.

Dimensions of boxes(D1, D2, C1) = 150*150*100 mm³

Dimensions of boxes(C2, D3) = 150*150*200 mm³

Dimension of Layer of aggregate at initial material collecting site = 300*150*50 mm³

SPECIFIC RULES

1. Only the aggregates dumped into the boxes (D1, D2, D3) will be accounted for scoring.
2. The bot should not scoop the aggregates of the next stage, unless it has completely crossed the previous stage (For e.g. to scoop up the aggregates from 2nd stage, the bot should completely cross the 1st stage area).
3. To cross the initial, First and Second Stage, the bot has to dump a minimum of 750g, 450g and 300g aggregates repectively.
4. Although width of stages and ramps are 700mm, there will be reward of 150, 300, 450 marks for not letting the bot outside the area with width of 600mm, 500mm and 400mm respectively at all.
5. Once the bot crosses any Stage, it is not allowed to scoop aggregates from the previous stage. Doing so will result in the disqualification of the team.
6. Each team can have a maximum of 5 and a minimum of 3 members.
7. Each team can only have 2 timeouts, in the entire session.
8. Each team can have a maximum of 1 restart which will be permitted only if asked before crossing the first Stage of aggregates.
9. If the bot topples, the participants can place it back in the correct position and continue the task. There will not be any penalty for this, although the time will keep running during this course.
10. In case of a tie, extra time of 2 minutes will be given. The team with maximum points will be declared the winner.
11. Maximum time for the completion of task: 10 minutes. No extra time would be given.
12. The decision of the Megalith Team shall be final and binding.

SCORING

The scoring will be completely on the basis of weight of aggregates filled in the boxes within the given time frame.

$$Points\ Awarded = W1 + 2*W2 + 5*W3 + 600(FS) - 400(R) - T*100$$

W1 = Weight of aggregates in grams in D1
W2 = Weight of aggregates in grams in D2
W3 = Weight of aggregates in grams in D3
FS = Final stage
T = No. of timeouts
R = Restart

[Note:-1. If your bot reaches Final stage after completing previous stages, you will get the extra 600 points
2. Besides above scoring marks there is an additional reward as merntioned in the specific rule no. 4]

CONTACT US

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