

Task 3: Remove Debris Blocking Entry

To Be



The stage shown (grey) is 4.8 m (16 ft) wide x 3.6 m (12 ft) deep x 3.0 m (10 ft) tall with a central alcove for the robot to enter that is 80 cm (32 in) wide x 2.1 m (7 ft) tall blocked with well defined debris in a describable arrangement. The entry has partial cinder block walls on both sides to contain the debris and ensure all robots approach the pile similarly. This task encourages grasping, lifting, and placing enough debris over the side of the partial walls to pass through the entry.



A self standing Task Wall can be fabricated by teams or assembled into the DRC Trial Stage (with additional signage header over top and optional terrain in front)

As Is



Task 3: Remove Debris Blocking Entry

- Items to Purchase

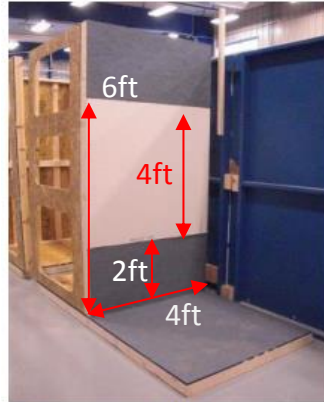
Item	Dimensions (w x h x d)	Material	Weight	Quantity
Long posts	3.5 x 3.5 x 40 in	Wood	<4.4kg(10 lb)	4
Pipes	1.5D x 48 in	Aluminum or steel	<4.4kg(10 lb)	3
Truss Structure (see the picture)	12 x 12 x 60 in	Aluminum	<4.4kg(10 lb)	1
Wide boards	5.5 x 1.5 x 48in	Wood	<2.2kg(5 lb)	4
Boards	3.5 x 1.5 x 48 in	Wood	<2.2kg(5 lb)	4
Short Posts	3.5 x 3.5 x 20 in	Wood	<2.2kg(5 lb)	4
Cinder block	6x8x16 in	Cinder concrete	-	24



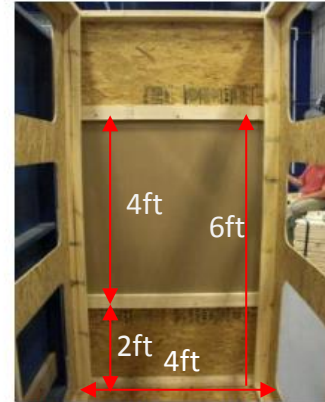
Cinder Block

Task 6: Break Through Wall

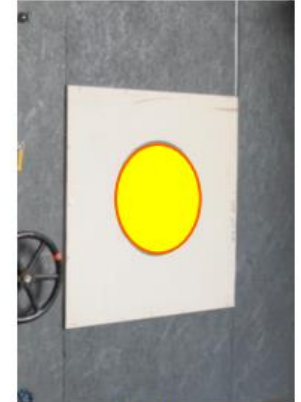
To Be



A self standing Task Wall can be fabricated by teams or assembled into the DRC Trial Stage (with additional signage header over top and optional terrain in front)

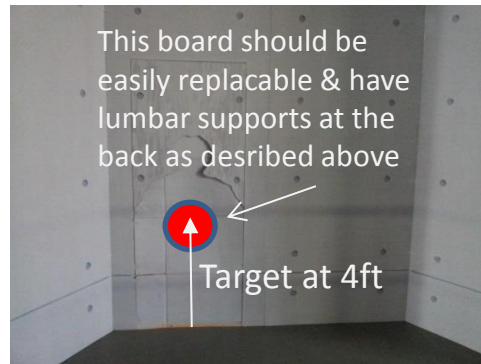


The back side of the Task Wall has lumber supports placed horizontally centered at 60 cm (2 ft) and 90 cm (6 ft) elevation to attach replaceable 1.2 m (4 ft) square panels of dry wall or hardi-board for cutting.



A target can be placed on the Task Wall as an indicator of the area intended to be removed. It should be roughly a 60 cm (2 ft) geometric shape.

As Is



Task 6: Break Through Wall

- Items to Purchase

Item	Maker	Model	Weight	Specifications	Quantity
Rotary Tool (cut out tool)	Dewalt	DC550KA (tool & toolkit set)	<5kg	18V, Cordless(Battery powered)	1
Multi-Tool with Trigger	Ryobi	P340 Job Plus	<5kg	18V, Cordless(Battery powered)	1
Two Handle Drill and Bit Saw	SKIL	2895-01 Drive II	<5kg	18V, Cordless(Battery powered)	1
Drywall board	?			4 x 4ft square One side is in white color, Thickness unknown	Multiple for tests
Hardi board	?			4 x 4ft square One side is in white color, Thickness unknown	Multiple for tests



Rotary Tool
(i.e. Dewalt 18V Cordless Cut-Out Tool)



Multi-Tool with Trigger
(i.e. Ryobi P340 18V Cordless Job Pil)



Two Handle Drill and Bit Saw
(i.e. Skil 2895 18V Cordless Drill)

Specific concerns (up to 7 bullets on 1-slide)

- Sensor head(sensor suit for perception) is not ready --> delay perception system tests
- Crippled the upper body Hubo --> delay perception-manipulation tests
- Hubo finger design → As DARPA released the details of tasks, we are not sure that the fingers will be able to (i)reliably grasp various power tools and rubble elements(e.g. ~4.4kg wooden posts), and (ii)trigger the power tools (in case trigger button configuration is not traditional(gun-type), current triggering finger may not work)
- Hubo payload → As DARPA released the details of tasks, we are not sure that DRC Hubo's payload is enough for the completion of tasks yet.
- Lack of spare parts (or delay in parts supply)
- Difficult to have access to CAN protocol document: it takes long to get the protocol info, or, sometimes, documentation is unclear/incorrect

Any h/w design suggestions on Beta improvement (up to 7 bullets on 1-slide)

- Easy to debug/test/maintain CAN bus – Under current design, it is not easy to locate the source.
- More reliable IMU and force-torque sensors
- Dust-proof design: Wall breaking task will produce lot of sawdust and it may hamper Hubo's joint and cooling fans. We may need some sort of dust cover for vision/laser scanning sensor too.