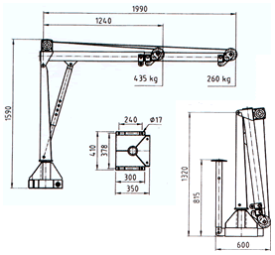

Challenge #5 Robotic Rescue

With the greatest of skill and careful planning, you were able to free Ambeeul from the dinosaurs grip. It is now time to move on, time is ticking, and we must find the downed plane.

You and your expedition continue through the jungle, hiking for a number of days following the great river of Wessnovia. The weather has been very uncooperative. It is not uncommon for the rain to start falling around sunrise and then continuing for hours. The river has overflowed its banks and many lower spots in the jungle have become flooded. On the fifth day after the dinosaur attack, you spot stone towers jetting out of the jungle forest canopy. It appears to be a very ancient city. You and or team cautiously approach the ancient habitation. As you and your team enter the main courtyard of the great city temple and structures, you notice that the site has been badly damaged by the torrential rains and flooding. Many trees and jungle debris seem to have rushed into the courtyard from the hills that surround this ancient city. You look around and it appears has if all the people have abandoned the city after the flood. Then you hear a cry for help coming from a stone well in the center of courtyard. A man was washed down into the well and is trapped by all the flood debris. The logs that block the well are very heavy, and moving one log at a time could cause the other logs to break lose and fall in the well on the trapped man. You decide that you are going to create a simple hydraulic arm to remove the logs in one bold move. First, you need to determine if the soil around the well can handle the pressure of the robotic arm.

a.) Determine the pressure that the robotic crane will exert on the ground under it. The robotic arm has mass of 3300kg. The base of the robotic arm is a circle, with a radius of 2 metres. The formula for pressure is $Pressure = {}^{Force(N)} / {}_{Area\ (m^2)}$.

Remember: about 100g (0.1kg)= 1Newton

Area of a circle formula Area=πxradius^2 or A=πr^2 SHOW ALL WORK!

The soil around the well can hold a pressure of **<u>2.8 kPa</u>**.

1>)Question: According your teams calculations, can you proceed to build the robotic arm on the soil around the well?

Challenge: you must create a hydraulic arm that can move objects off the well.

A.) It has to be able to lift objects from the ground to a height of <u>30 cm</u>.

B.) It has to be able to move objects to the right or left from where they were picked up.

C.) The arm needs to be able to grab and release the objects with out direct human help.

<u>Materials</u>: (I will supply)

-Up to 6 syringes and tubing
-one long bolt and nut
-cardboard
-string
-white glue
- 2 metres of duct tape
-up to 4 metres of tape
- You can bring any other materials you want to use from home

Questions

1.) How well did the other members of your group cooperate? Did everyone share the work?

Rate: each member of your team out of four by writing their name under the rubric area that you think best describes their effort and cooperation.

CATEGORY	4	3	2	1
Working with Others	Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together.	Usually listens to, shares, with, and supports the efforts of others. Does not cause "waves" in the group.	Often listens to, shares with, and supports the efforts of others, but sometimes is not a good team member.	Rarely listens to, shares with, and supports the efforts of others. Often is not a good team player.
student name(s)				

2.) Compare your hydraulic arm to others in the class. What do like about yours over other designs you have seen? What ideas would you use from other groups you have seen?

Ronnie says, “Robots to the Rescue! Time to get creative.”