CHALLENGE 2023-24

THE CHALLENGE SCENARIO:

Your team will design and build a device operated by fluid power that picks up wooden cylindrical objects from the "START" position and then places them on one of three destination shelves. The object must be moved and placed in an upright position on your chosen destination shelf. Your task will be to transport as many objects as possible in a time frame of two minutes.

SPECIFICATIONS:

The base of your device will sit in the "FOOTPRINT AREA", a rectangle 8" X 5¾" and it is surrounded by a wall approximately ⅜" wide and 1" high. The plane of the "START" and the FOOTPRINT AREA is the same and the start position is a small circle, 2" in diameter, where cylinders will be placed. The three shelves or target areas are all ¾" high. To place an object on the top shelf it must be lifted vertically 2¼".

The wooden cylindrical objects are 2¾" high and 1¼" diameter and each cylinder weighs approximately 1½ oz.

Your team will choose the destination shelf for each cylinder. A cylinder moved correctly to bottom shelf is worth 1 point, to the middle shelf, 2 points and to the top shelf, 3 points. Your team can move cylinders to any of the destination shelves every time you move a cylinder.

Any cylinder dropped in transit will be returned to its starting position. Once a cylinder is moved to its destination zone it will be returned to its starting position ready to be moved again.

All movements of the device MUST be controlled using fluid power.

IF YOUR TEAM MANUFACTURES A DEVICE THAT ONLY WORKS WHEN IT IS STABILIZED BY HAND(S) THEN 50% OF THE 'MOVING OBJECT' SCORE WILL COUNT.

IF YOUR TEAM BREAKS THE DEVICE DURING THE ALLOCATED 2 MINUTES THEN YOUR TEAM CAN REPAIR IT DURING THOSE 2 MINUTES AND SUBSEQUENT 'MOVING OBJECT' SCORES WILL COUNT 50%

IF YOUR DEVICE IS TOUCHED BY HAND IN ANY OTHER WAY, THEN THE 'MOVING OBJECT' SCORE WILL BE ZERO

BEFORE THE COMPETITION:

Your team will design a device to move the cylinders and record your process in a team portfolio. At the Workshop your team will be introduced to the variety of tools and the materials you can use by building two kits that demonstrate movement using pneumatic power. Between the Workshop and the Challenge, you must design your solution. Credit will be given to a well-designed device PARTICULARLY one that is strong and stable (i.e. counter-balanced), makes economical use of the materials available and effective use of the piston-syringes.

AT THE COMPETITION:

Working co-operatively your team will build a device and use it to meet the Challenge using the plans in your portfolio and from the same materials that you take with you to your school (with the following additions: 8 glue sticks, two 20cc syringes, an extra white syringe holder and an extra 6ft. of tubing).

Glue stations will only be available after lunch on the competition day according to the discretion of the Challenge Facilitator. You are encouraged NOT to use hot glue unless it is an emergency – wood glue and cardboard gussets are much stronger and less likely to become loose if in contact with water.

DELIVERABLES:

Your team will bring TWO COPIES of its portfolio and the tools kit to the competition. The judges will evaluate one of your portfolios and all your team members will be expected to answer questions about the function and design of your device. You will be judged according to the Challenge Rubric.