

Pasta Crane



The challenge is to make a crawler crane out of pasta. The crane is to have a fixed base. The crane boom is to be at an elevation angle of $70^{\circ} \pm 10^{\circ}$ and at least 50 cm long measured from its base. The crane can be placed flat on the ground or rested in a shallow pan of (dry!) sand for stability, no more than 5 ± 2 cm off the ground. The structure should be made out of uncooked common pasta, with the only exceptions being small pulleys/axles/crank-arm/windlass for the crank/lift system (for which teams may select their materials), two pieces of household thread or string (less than 1 m each) for boom supports, and one piece of household thread or string for the crank/lifting system. The structure should have a mass of 2500 grams or less (exclusive of sand base, load, and counterweight, but inclusive of the lifting system). The crane must include an integrated hand-operated crank system to lift the weight.

The objective is to maximize the weight the crane can lift 30 cm off the ground. Teams will provide the weight. The weight must be detachable in order to weigh the structure and load separately. Teams will have 90 seconds to lift the weight to the 30 cm height. The bottom of the weight must be a full 30 cm off the ground for the lift to be successful. The weight is to be lifted by operating a crank system attached to the crane. Teams will hand-operate the crank. The score for this event is the weight successfully lifted. Teams will have two trials and the better score will count. Teams will have several minutes between trials to make adjustments, but both trials must occur with the same crane structure.

The structure can have a counterweight for stability. Teams can choose any material for this. The counterweight must also be detachable for weighing the structure.

Pieces of pasta are to be glued together using white/yellow/hobby/wood/construction glue only. One exception to this is the long pieces comprising the main longitudinal members of the boom - these and only these may be connected using epoxy or epoxy putty, and this includes the endpoints of the boom. Coating of members is not allowed - glue is only to be applied at joints. Some *minor* overgluing is to be expected and will be tolerated within reason by the judges.

The judges reserve the right to veto any design that they deem counter to the spirit of the rules and their decisions will be final. Please ask them *in advance* for clarification or adjudication in order to avoid disappointment on event day.