



## 2024 MATE World Championship Competition Bonus Collaborative Mission

In addition to the requirements in the competition manual, the Tennessee Valley Authority has requested that multiple ROVs assist with construction of a new section of Boone Dam. To expedite the construction, multiple ROVs will be working together, at the same time.

Constructing a new section of the dam involves creating a form, which is a solid outer structure into which concrete for the foundation will be poured. A framework of pipe has already been installed. The forms will need to be attached to this framework.



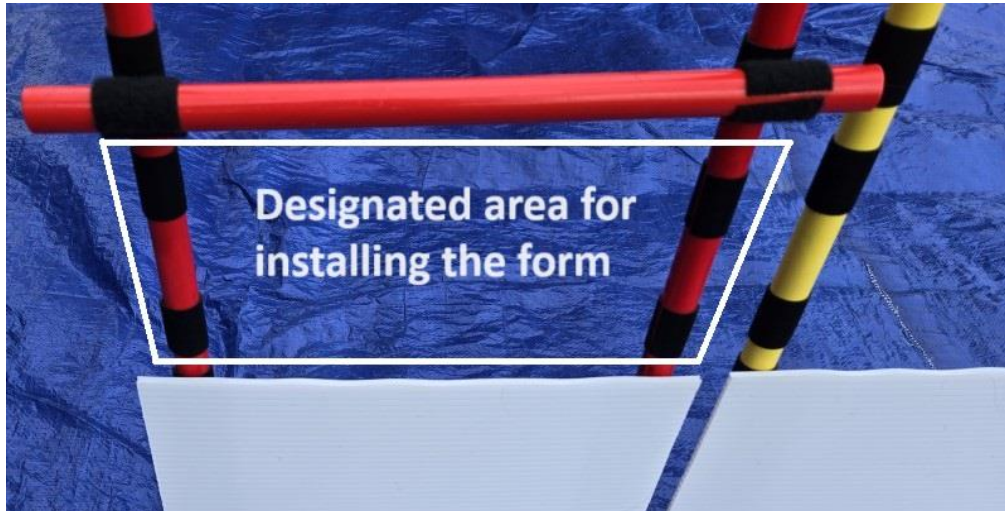
<https://www.wikihow.com/Build-a-Straight-Form-for-Concrete>

### MISSION NOTES

During check-in, each company will receive a piece of corrugated plastic form with Velcro loops already attached. The PVC framework, with colored vertical pipes, will already be in the pool and will have Velcro hooks attached.

During the collaborative bonus mission, companies must transport their corrugated plastic form from the surface to the mission area and install it onto the PVC framework.

When arriving at the mission station, companies will be assigned a color (red, yellow, orange, purple, pink, white, green, or blue) and assigned one side of the framework to add their form to. Companies will receive 10 points for successfully installing their form onto the PVC framework. Successfully installing the form onto the PVC framework is defined as the corrugated plastic form no longer in contact with the ROV and attached via Velcro to the designated location on the PVC framework. The designated location is defined as 1) the area above any forms that have already placed by a previous team, 2) below a colored marker (PVC pipe) placed by the diver and 3) including the two colored vertical pipes assigned by the station judge.



The designated location for placing the form in the “red” section.

All companies that successfully installed their form will also receive points depending on the total number of forms placed.

60 to 82 forms placed:	15 points
40 to 59 forms placed:	10 points
20 to 39 forms placed:	5 points
1 to 19 forms placed:	0 points

In total, companies can receive 25 points in the collaborative bonus mission if they successfully place their form and at least 59 other teams successfully place their form as well.

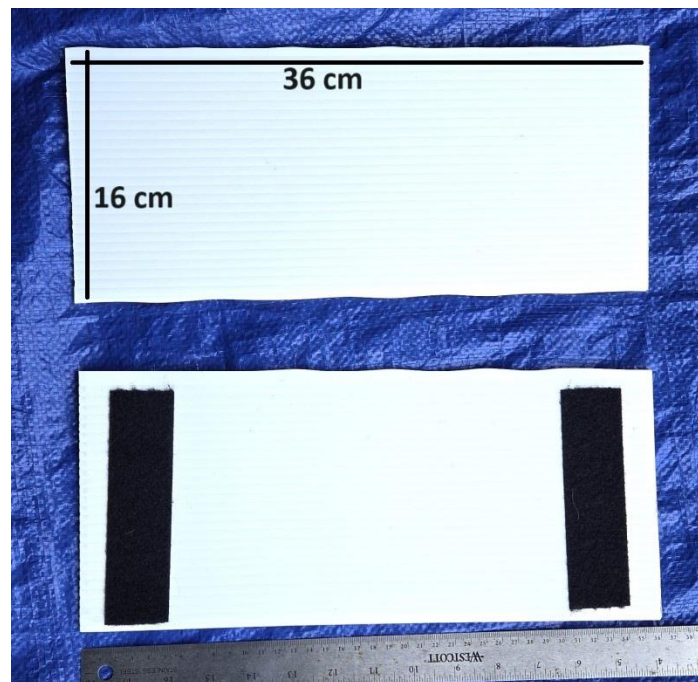
Companies will receive the corrugated plastic rectangle form during check-in but must determine how to transport it to the mission area PVC framework. How this is accomplished is up to each company. Companies may bring tools or attach additional materials (rope, U-bolt, Velcro) to the form to aid in transportation. Companies may not add any additional Velcro to the backside of the form to aid in attaching it to the PVC framework. Any additions to the form will not be considered debris.

Companies are also encouraged to decorate their form (front and back) with their company name or logo, apply themed stickers, and/or decorate with other fun, artistic expressions.

On Saturday morning, companies will have one chance to place their form onto the PVC framework. Four companies (a mix of RANGER, PIONEER, and EXPLORER class) will attempt to place their form onto the PVC framework simultaneously. Two ROVs will be designated to place their form on one side of the PVC framework, while two will be designated to place their form on the other side of PVC framework.

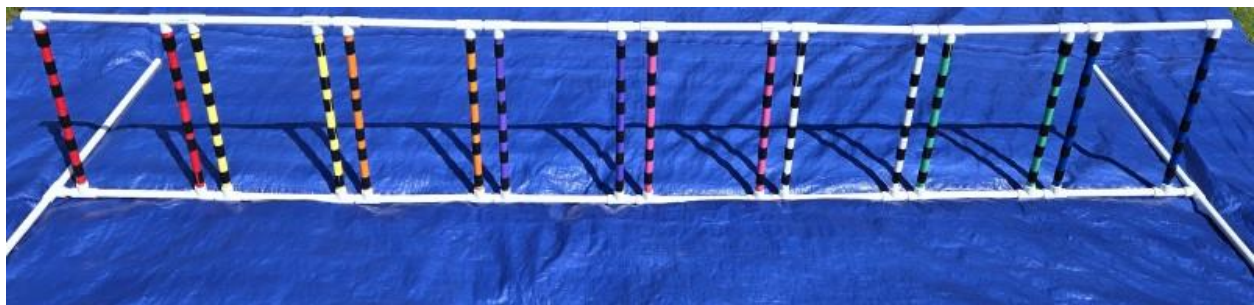
### **COLLABORATIVE BONUS MISSION BUILDING NOTES**

The form will be constructed from a corrugated plastic sheet 36 cm by 16 cm. Two lengths of Velcro will be attached to the back of the corrugated plastic sheet.



A from.

The PVC framework will be constructed from ½-inch PVC pipe. Eight sets of vertical lengths of PVC pipe will be painted red, yellow, orange, purple, pink, white, green and blue.



The PVC framework.

Companies will have 10 minutes to place their frame onto the PVC framework. Companies will have 5 minutes to set up and 3 minutes to demobilize their ROV.

Companies may only place their own form; they cannot place other companies' forms for them. However, companies may assist other companies by providing directions and guidance or returning a dropped form to the surface, side of the pool. Companies unable to place their form with their ROV may ask to pilot another company's ROV to place their form; similarly, companies that have successfully placed their form may offer their ROV to another company to pilot in order to place that company's assigned form.

For example, while company A was successful in placing their form, company B was not. Company B can pilot (with permission) company A's ROV to place their (company B's) form.

If requested to do so, divers will return any dropped form to the surface, side of the pool. Companies may reattach it to their gripper and attempt to install it again. Between runs, divers will also "clean up" any forms placed on the PVC framework, positioning them so the next teams have a clean designated area to work with.

**Collaborative Bonus Mission Schedule:**

**Station 1**

	Table A	Table B	Table C	Table D
8:40	EX01	RN01	RN10	EX02
9:00	EX03	RN02	RN12	EX04
9:20	EX05	RN03	RN17	EX06
9:40	EX07	RN04	RN09	EX10
10:00	EX09	RN05	RN11	EX08
10:20	EX11	RN06	RN13	EX12
10:40	EX13	RN07	RN14	PN06
11:00	PN03	RN08	RN15	PN04
11:20	PN05	PN01	PN02	PN13
11:40	PN11	PN07	PN10	PN12
12:00	PN08	PN14		PN09

Station 2

	Table A	Table B	Table C	Table D
8:40	EX14	RN20	RN30	EX15
9:00	EX20	RN21	RN31	EX17
9:20	EX18	RN22	RN32	EX19
9:40	EX16	RN23	RN33	EX21
10:00	EX22	RN24	RN34	EX23
10:20	EX24	RN25	RN35	EX25
10:40	EX26	RN26	RN36	RN16
11:00	EX27	RN27	RN37	RN18
11:20	EX28	RN28	RN38	RN19
11:40	EX29	RN29	RN39	



## 2024 MATE ROV Competition World Championship Collaborative Bonus Mission Scoresheet

**Company Name:** \_\_\_\_\_

**Company Number:** \_\_\_\_\_

- 10 points - Company successfully installs the from 0      10
- Bonus points 0   5   10   15

**Total Points:**

Note: Bonus points are dependent on how many total forms are installed.

- 60 to 82 forms installed: + 15 points
- 40 to 59 forms installed: + 10 points
- 20 to 39 forms installed: + 5 points
- 1 to 19 forms installed: + 0 points