

2021 PROVINCIAL SKILLS CANADA COMPETITION



CONTEST DESCRIPTION

CONTEST AREA: ROBOTICS			LEVEL: Secondary
COMPETITION SCHEDULE:			LOCATION: COMPETITOR'S SCHOOL.. SEE COMPETITION FORMAT INFORMATION BELOW.
Mandatory Tech Check	April 12	9:30-10:30AM	
Registration	April 14	7:30-8:00AM	
Orientation	April 14	8:00-8:30AM	
Team Robot Checks	April 14	8:30-10:00AM	
Tournament	April 14	10:00AM-12:00PM	
Lunch Break	April 14	12:00-1:00PM	
Team Prep	April 14	1:00-1:30PM	
Tournament	April 14	1:30-5:00PM	
DURATION: 7 HOURS			REGIONALIZED: NO
COMPETITION FORMAT: (VIRTUAL/ IN SCHOOL) All secondary competitors will be competing with in their school environment and must arrange in advance with a teacher for a safe competition location, according to their school's Covid-19 safety policies. They will need to prepare their competition space with all of the required tools, equipment, materials, and technology (as listed below) that will be needed to			

complete the competition. Teachers and competitors will need to work together to ensure the competitor is ready for success on their competition day.

Each competitor must have a teacher/ supervisor available throughout the day, in case of incident. (Teacher/Supervisor must be present at the competition orientation.)

The Robotics competition will take place in a round robin tournament style. Competitors tournament times will be determined in advance of the competition.

Competitors and Teachers should be prepared to receive additional information about the competition projects, livestreams, shipping, etc. prior to the competition. Please ensure you are double checking for emails from Skills, including checking junk mail.

WEBEX LIVESTREAMS:

Tech Check: A **MANDATORY** “Tech Check” will take place prior to the competition with the purpose of giving the competitor an opportunity to ensure they have all of the necessary technology in place to join in their virtual orientation meeting the morning of their competition. On the competition day, there will be no time to work out technology issues. This is the opportunity work out any unforeseen issues and to start your competition day off prepared. There may also be an opportunity to ask questions regarding the competition day, if time allows. **The teachers who will be supervising the competition day should also be in attendance. Please log in with two screens labeled as described below. An email with the WebEx link will be sent out in advance of the competition.**

Competition Orientation: The competition will begin with a virtual orientation. Competitors will join the assigned videoconference link that will be emailed to all registered competitors for the competition orientation. Camera’s **MUST** be on and competitors visible on the camera during the orientation. Competitors will be expected to have their camera on for the orientation. **The teachers who will be supervising the competition day should also be in attendance.**

Live Streamed Competition: Competitors must film their competition through out the entire day. Camera’s **MUST** be on and competitors visible on the camera, as well as mics working. Competitors must consider their camera angle and lighting in advance of the competition. It is the competitors responsibility to ensure they are prepared for a day long livestream.

CIRCUIT DIAGRAMS DUE APRIL 9TH 2021

PROJECT SUBMISSION LINK:

- <https://form.jotform.com/SkillsAB/2021PSCC>

- Multiple files can be uploaded at once, each file has a maximum size of 1G. If file sizes are larger than 1G, please follow alternate instructions through the submission link.

ACCEPTED FILE TYPE: pdf, doc, docx, xls, xlsx, csv, txt, rtf, html, zip, mp3, wma, mpg, flv, avi, jpg, jpeg, png, gif. If you would like to submit a different type of file, please place it in a zip folder.

To create a zip folder – Select all the files that you would like to submit and right-click your mouse, a menu will open, select Send To, and then click on Compressed (zipped) folder. A zip file will then be created containing your submission documents.

Submission Requirement: 3rd recorded video of robotics competitions. (Best submitted as zip files.) Submissions will be due within 30 minutes of the end of competition time. Please note: Late submissions will not be accepted.

SAFETY:

The health, safety and welfare of all individuals involved with Skills Canada Alberta are of vital importance. Safety is a condition of participation with Skills Canada Alberta and shall not be sacrificed for the sake of expediency. At the discretion of the judges and technical committees, any competitor can be denied the right to participate should they not have the required proper safety equipment and/or act in an unsafe manner that can cause harm to themselves or others.

Safety Checklist: It is the responsibility of each competitor and teacher to review the Safety Checklist (<https://skillsalberta.com/additional-2021-competition-resources/>) in advance of the competition and ensure they are able to meet all safety requirements. During the orientation, the safety checklist will be formally reviewed.

VIRTUAL COMPETITION RESOURCE SUPPORT FORM

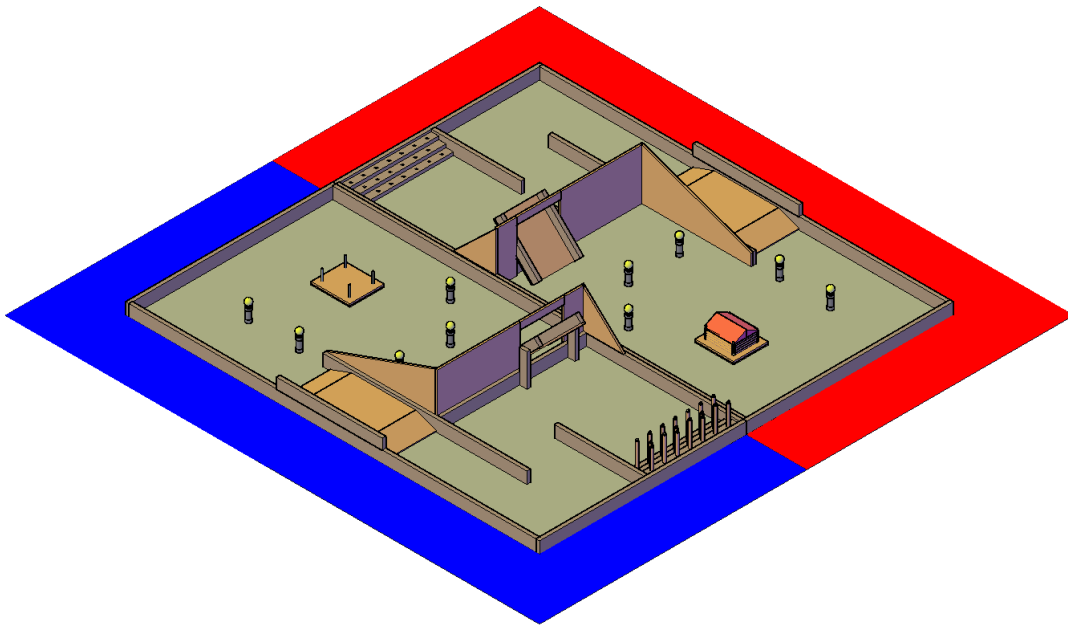
A \$40 competition resource subsidy is available to all competitors. It is intended for items that were purchased to support competitors (e.g. materials, technical equipment, tools, etc.). The form can be accessed at the following link: <https://skillsalberta.com/additional-2021-competition-resources/>

AWARDS CEREMONY INFORMATION: Please join us for a live virtual awards ceremony on May 13th at 6:30PM.

Please note: This document is subject to change as competition information is updated. Competitors are responsible for staying up to date with the most recent information. Check the footer for last updated date. Changes will be highlighted in yellow.

2021 Skills Alberta Robotics Competition

Log Cabin Construction



Date: April 13th to April 24th, 2021 in Edmonton, Alberta

Technical Committee Chair: Sheldon Marquis

E-mail: smarquis@ualberta.ca

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1. 2021 Virtual Competition Format

Due to the ongoing COVID-19 worldwide pandemic, it was decided that this year's competition will have to move to a virtual competition:

- a. Teams will compete from their own schools and be responsible for setting up everything they need to successfully compete.
- b. Participating Schools will receive a ready to assemble court, with everything they need to assemble. It will be the responsibility of the school to complete the assembly of the court prior to the competition day.
- c. The court will need to be placed on a hard, smooth surface for competition time (IE no carpet.) If this is not possible, hard board will need to be purchased for a court floor.
- d. Competition Day schedule will be released the morning of the competition.
- e. Teams must be set up with cameras to allow for them to be proctored on one of the competition days.
- f. Three camera requirements:

1. Livestream Number 1 – Angled from the top left corner (Forrest Side) Device (phone, laptop, computer with webcam) signed in to livestream as "Team Number A" (IE – if team number is 1, title your camera as 1A)
2. Livestream Number 2 – High level angle (Bird Eye View) Overlooking the entire court. Device (phone, laptop, computer with webcam) signed in to livestream as "Team Number B" (IE – if team number is 2 title camera as 2B)
3. OPTIONAL Non-Live Recording – Back up recording, in case of potential technology emergency with Livestreams. Gives competitors opportunity to demonstrate competition integrity was maintained. Centered side angle of the court, showcasing the entire court.

- g. The specific schedule that teams will have to follow will be released in an email sent in advance of the competition.
- h. Competition Day expectation will be reviewed in the morning orientation.

2. Definition of terms referenced in this document

- a. Tele-Operated Robot Elements are elements under the direct/active control of

competitors during game play using one or two radios/game controllers held by the courtside competitors.

- b. Mobile Independent Autonomous Mobile Robot Elements are elements that at the start of a game have a competitor pressing their start button or enter on a computer keyboard as the only competitor to Independent Autonomous Mobile Robot Element communication during the entire game.
- c. Stationary Independent Autonomous Elements are elements that have their power on at the start of games but have no direct contact with a competitor during game play. These units may interact with the team's tele-operated mobile robot with the actions of the tele-operated mobile robot triggering an active response by the Independent Autonomous Element which may be managed either by a mechanical based system (eg. A series of limit switches / no programmed elements) or a pre- programmed system (eg. Managed by an Arduino or other microprocessor) internal to the Independent Autonomous Element.

3. The Log Cabin Building Teleoperation Game Overview

- a. The core game situation requires a Robot or Robots to use the components provided in their Exclusive Use Court Space to (a) Harvest the trees and deliver the logs to the build site and (b) to Build the Log Cabin ON the Designated Foundation in the Assigned Robot Assembly Area.

4. Detailed Court Areas

4.1 The Trees

Teams have use of 20 trees/logs:

- i. Each tree/log will be constructed out of a 1 inch diameter wooden dowel. 10 trees/logs will measure 10 inches long. 10 trees/logs will measure 12 inches long.
- j. On each end of each tree/log there will be an eye hook. These eye hooks will be oriented in the same plane, as shown in Figure 1.
- k. At the start of the game, the trees will be located in the designated forest area, standing upright.
- l. At no point are the trees allowed to be thrown by robots or people. This includes during competition matches and during non-competition match times.
- m. Trees will be marked for use on each side using colored stripes applied by marker. This will be to ensure the trees/logs used on each side are the ones originating on that side. Teams

are not allowed to use trees/logs from the other team.

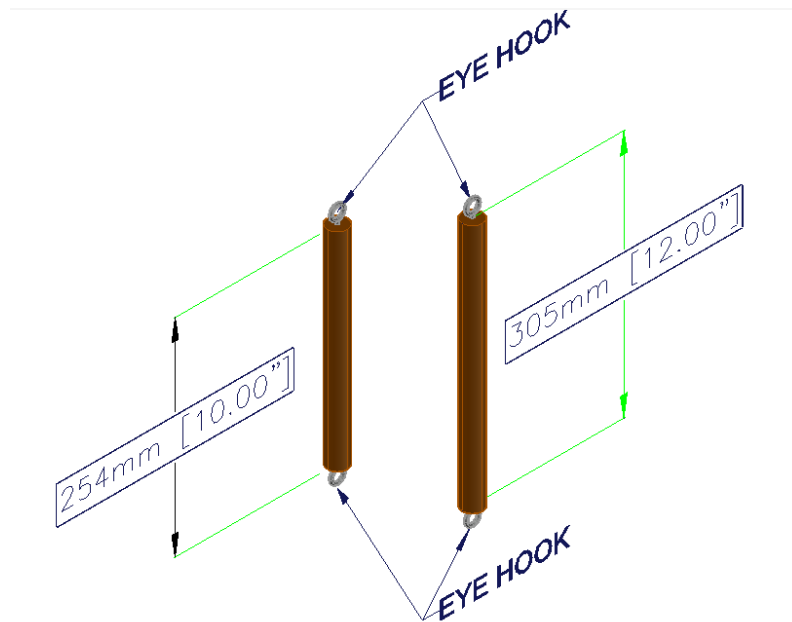


Figure 1: Trees/Logs

4.2 Forest

Each team will have a designated forest area where the trees will initially be located.

- a. Each team's forest is composed of 3 rows of trees, each at a different base level:
 - i. First row of trees will be at a base level of 1.5 inches.
 - ii. Second row of trees will be at a base level of 3 inches.
 - iii. Third row of trees will be at a base level of 4.5 inches.
- b. The rows will contain a set arrangement of trees:
 - i. First row will contain 7 trees, all of the longer variety (12 inch dowel)
 - ii. Second row will contain 6 trees, all of the shorter variety (10 inch dowel)

- iii. Third row will contain 7 trees, alternating in height in the pattern: Short-Long-Short-Long-Short-Long-Short
- c. Trees in the same level will be located at 6 inch increments (measured center to center).
- d. The first and third levels will align, while the second level will be offset by 3 inches.
- e. The trees will be standing upright, in holes drilled 1 inch diameter by 1.5 inch depth (the tree should be able to slide in and out of the hole easily).
- f. The forest base will be secured to the court.

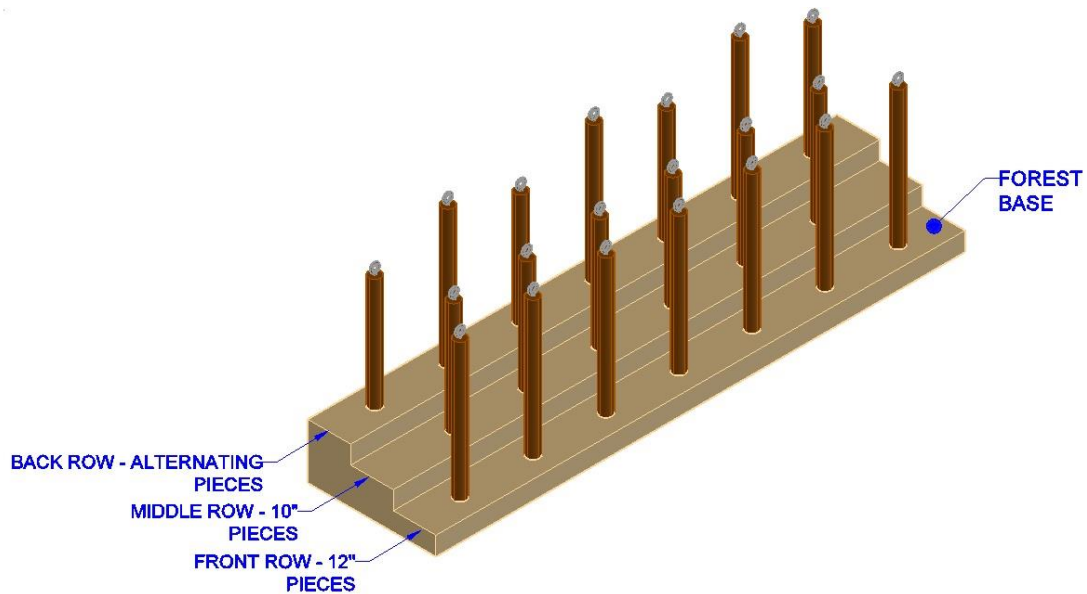


Figure 2: Forest

4.3 Cabin Foundation

Each team will have a designated Cabin foundation and building area:

- a. The Cabin foundation will be constructed of 2 pieces of $\frac{3}{4}$ inch plywood stacked on top of each other. The plywood pieces will measure 16 inches by 18 inches.
- b. The foundation will have 4 bolts ($\frac{5}{16}$ inch diameter, 6 inch long) standing vertically to represent the corners of the cabin. (2.5 inches from each side, 13x11 inches apart). These bolts will stand 5.25 inches above the foundation surface.
- c. The cabin foundation will be secured to the court surface.

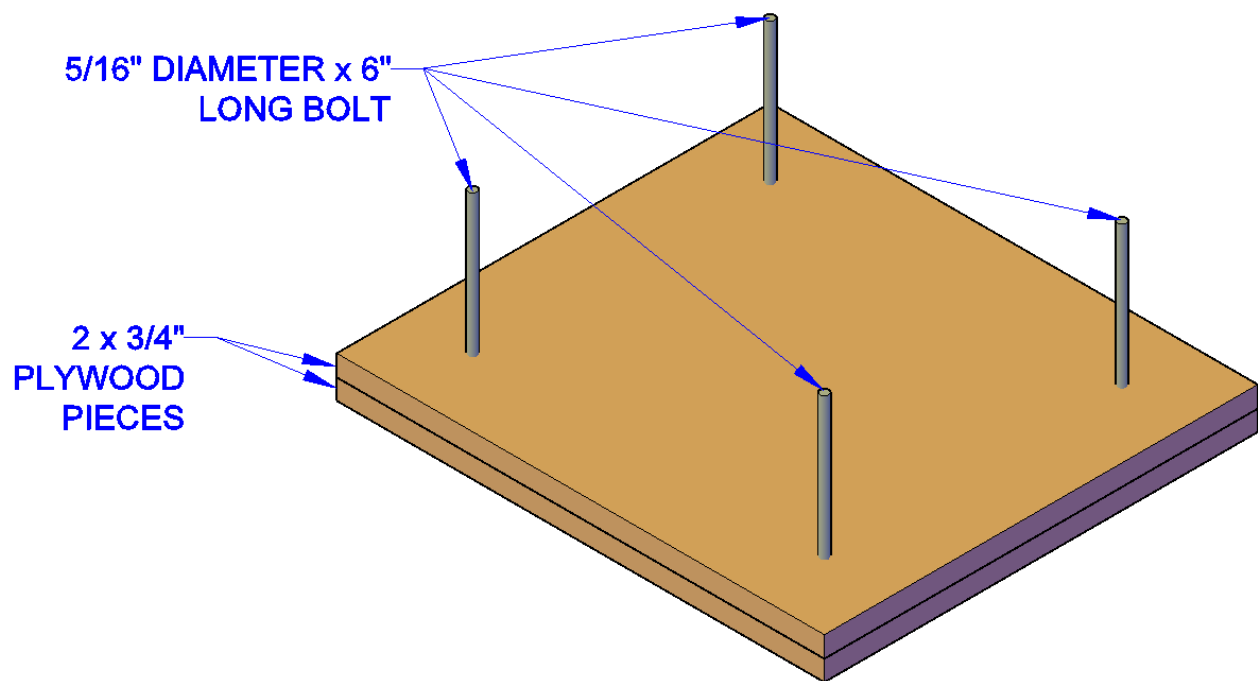


Figure 3: Cabin Foundation

4.4 Starting Platform

The Robots will start in a designated starting area. This starting area is on top of a platform in the pathway:

- a. The starting platform measures 24 inches by 30 inches, 4.25 inches above the court floor level.
- b. The platform has ramps on each side along the pathway. These ramps are 10.25 inches in length.

- c. Teams' entire entry must start on top of the starting platform and must not break the vertical plane. They must fit within the 24 inch by 30 inch starting platform (and must conform to the overall volume restrictions).

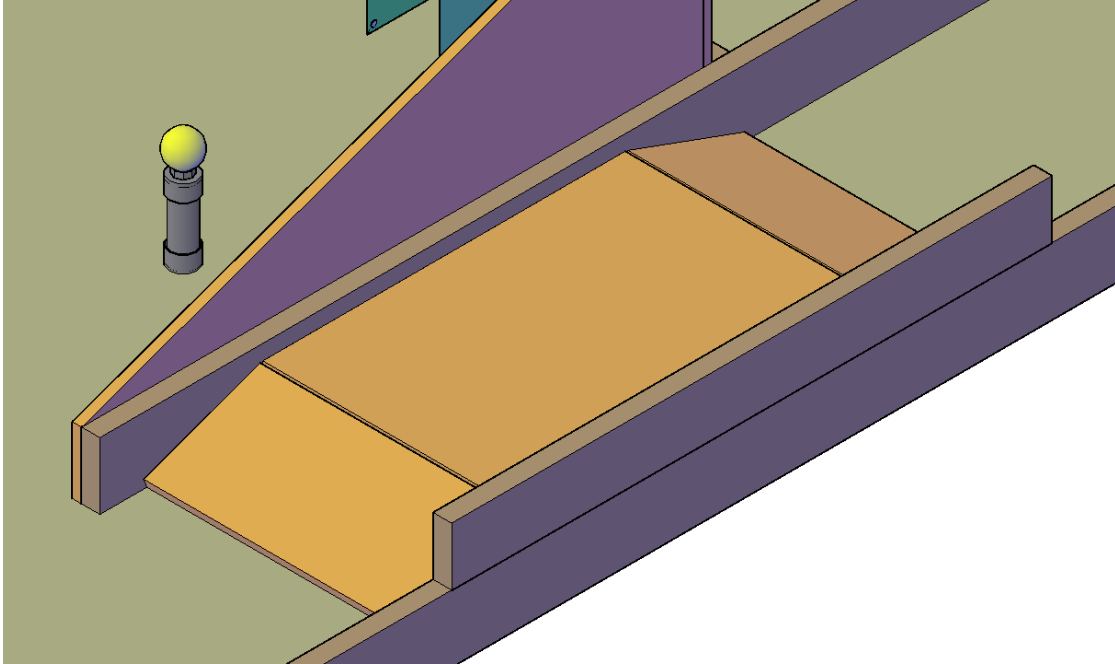


Figure 4: Starting Platform

4.5 River and Pathway

To deliver the logs from one side to the other, competitors must either use the pathway or send the logs down the "river".

- a. The forest side and the construction side of the challenge are separated by a 24 inch high barrier. Logs are not allowed to be passed over this barrier.
- b. The pathway is a 24 inch wide pathway section going from one side to the other.
 - i. Walls of this pathway are constructed using 2x6s.
 - ii. The Starting Platform is located along this pathway.
 - iii. Teams are not allowed to reach over the walls of the pathway.

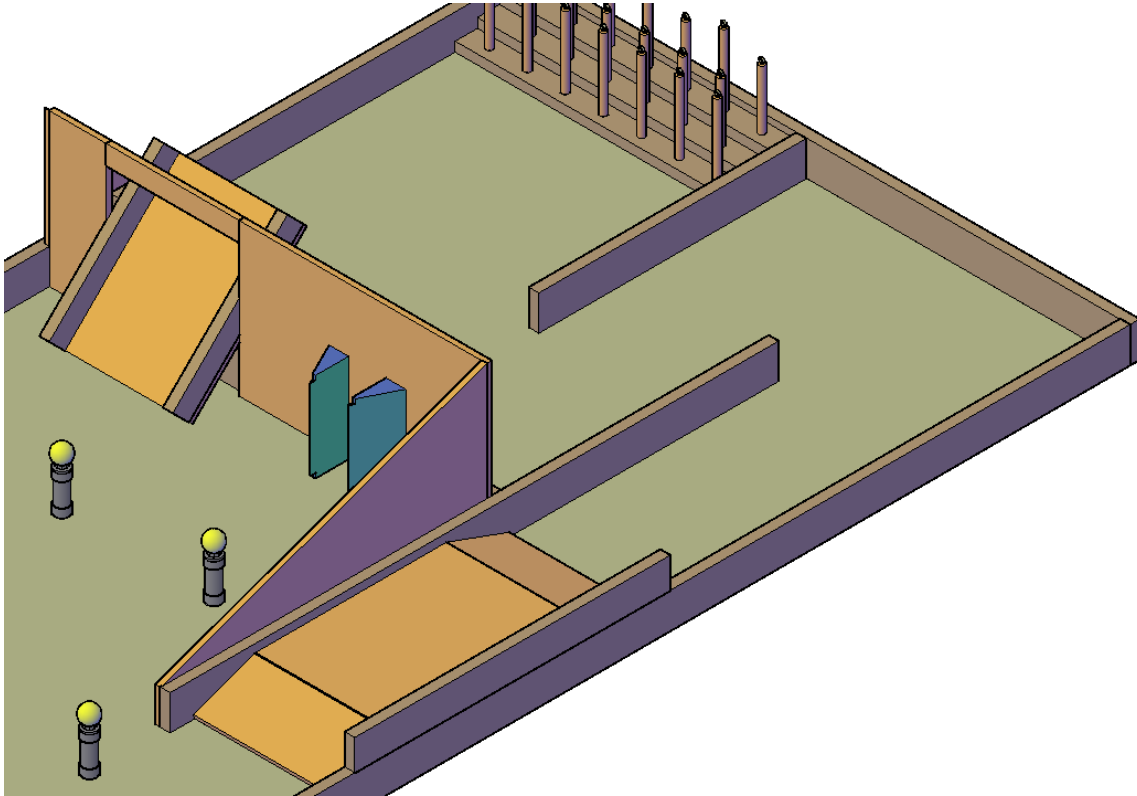


Figure 5: Pathway

- c. The River is a chute designed to send the logs from the forest side to the building side.
 - i. The river is a ramp for logs only. Robots are not to travel along the river.
 - ii. The river is a 45 degree angled ramp, 18 inches in height on the forest side, and runs directly to the floor level on the building side. The middle of the river is straddling the middle wall.
 - iii. There is a hole in the middle barrier directly above the river to allow logs to pass through to the other side.
 - iv. The river is 18 inches wide.
 - v. The river has a 2x4 lip on the edges.

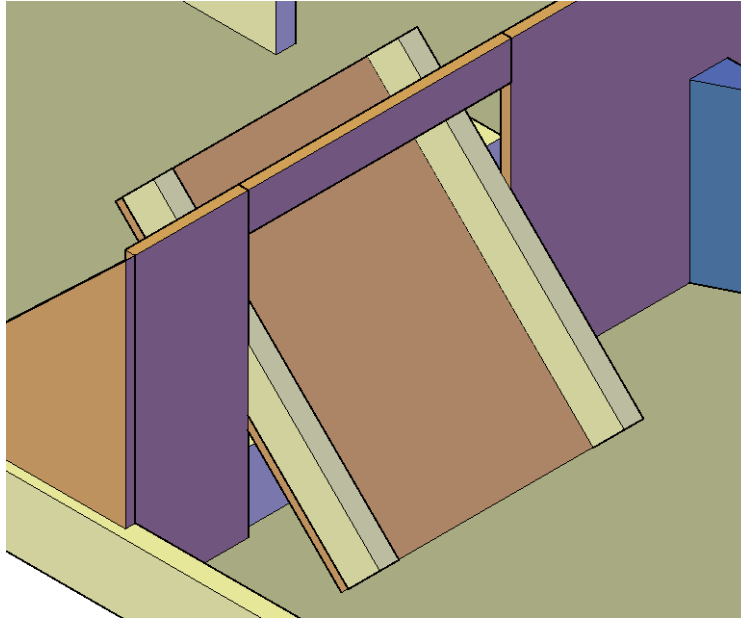


Figure 6: River

4.6 Power Poles

Located in the Cabin Building Zone, there are 5 Power Pole obstacles.

- a. Each power pole consists of a 6 inch long 1.5 inch diameter ABS pipe, capped on both ends. The caps used are identified in the parts list at the end of this document (with the court dimensions and parts).
- b. On the top of the ABS pipe, on top of the cap, there will be a 1 inch hex nut secured to the top. On top of the hex nut is where a standard tennis ball will sit.
- c. **The cap on the bottom of the ABS pipe must be secured to the court surface (Competitors will have to do so on their own with a small amount of duct tape.)** The ABS pipe will be fitted into this cap, but will be able to be knocked loose from the base cap.
 - i. Knocking the ABS pipe from the cap onto the court surface will not be considered damage to the court.
 - ii. Any action by the robots which cause the secured cap to break away from the court surface may be considered damaging the court, and would be treated as such.
- d. For each power pole standing at the end of the match, 1 point will be awarded. For each tennis ball remaining on top of the power pole at the end of the match, 1 point will be awarded.

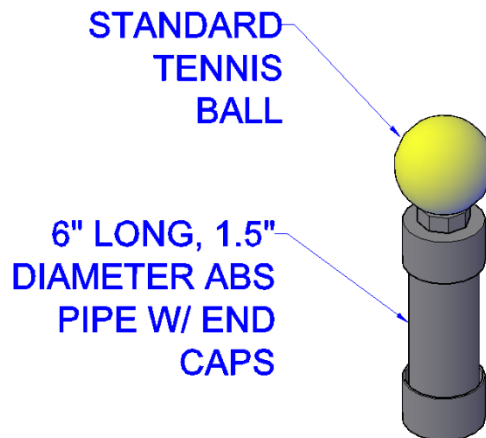


Figure 7: Power Pole

4.7 Log Cabin Construction

Building the Log Cabin involves:

- a. Delivering the logs to the cabin foundation
- b. Placing the logs onto the corner bolts of the foundation:
 - i. Each log must be placed with its eye hooks on 2 corner bolts to be considered as part of the cabin.
 - ii. Each wall will consist of 5 logs.
 - iii. 2 walls will use the 12 inch dowels. 2 walls will use the 10 inch dowels.
- c. Two roof pieces are to be placed on top of the walls.
 - i. Roof pieces are right triangular prisms constructed out of foam blocks.
 - ii. The roof pieces are right triangular prisms measuring 6 inches x 3 inches x 14 inches.
 - iii. The roof pieces will start on the cabin construction side of the playing field, along the middle wall, located 0 inches from the middle wall, 12 inches from the starting platform wall, and 6 inches between each piece.
 - iv. Roof pieces are the top of the cabin.
 - v. Roof pieces will be scored based on being placed on top of the last fully complete level of logs.
- d. A completed Log Cabin will consist of 20 logs and 2 roof pieces.

- i. The complete cabin will consist of 6 levels.
 - ii. 5 levels containing 4 logs each, and one level containing 2 roof pieces.
- e. The first team to complete a full cabin and return all their robots to the starting platform will receive one point (timing information may be used when considering a tie-breaker).
- i. Robots returning onto the starting platform will be considered on the starting platform if the robot is free standing on the starting platform without touching the any surface other than the starting platform.

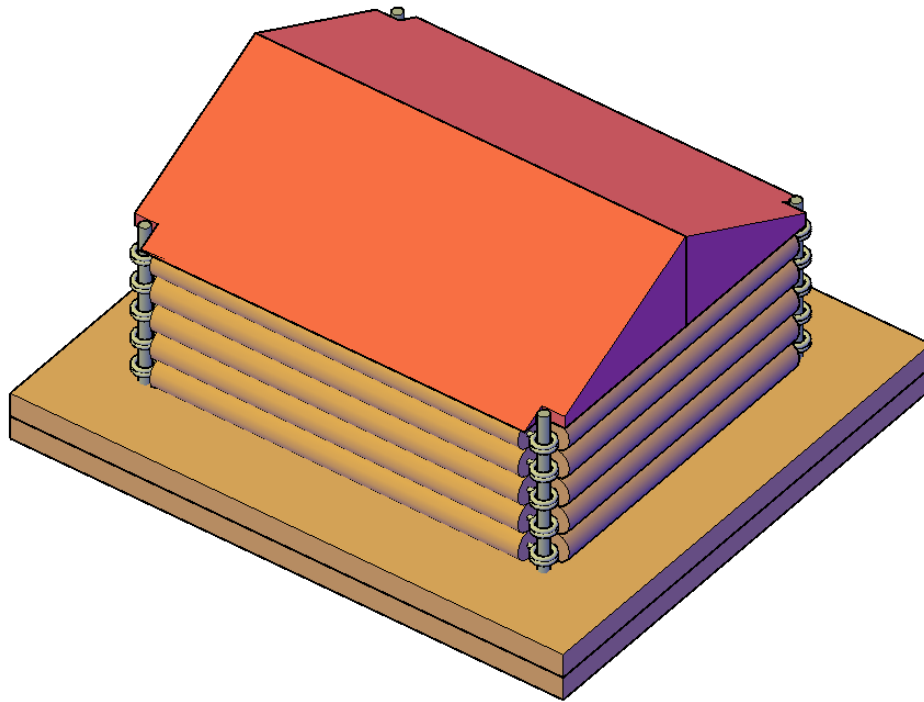


Figure 8: Fully Constructed Cabin

4.8 Additional Notes

- a. Robots cannot reach over or through any wall to deliver a log.
- b. Robots cannot reach over the middle barrier wall to deliver a log to the cabin assembly area.
- c. Robots cannot transfer the log over the middle barrier wall.

- d. Should any piece fall outside of the competitors playing area, the piece will be considered out of play for the remainder of the match. The pieces will be marked with a colored marker to keep track of these

5. Delivery Options

- a. Teams have One Travel Option for moving between the Forest area and the cabin building area (the pathway).
- b. Teams have 2 options for delivering the logs from the forest area to the cabin building area.
 - i. **Option One:** Carry the logs from one side to the other through the pathway, which contains a raised platform and ramps, OR
 - ii. **Option Two:** Send the logs down the river from the forest area to the cabin building area.

6. Exclusive use area

- a. Each Team's Exclusive Use Area is approximately 8 ft. by 16 ft.
- b. Teams have Exclusive Use of a 30 in. wide passageway along three sides of their assigned court area.
- c. Both Team Members can be active in and move throughout this entire team passageway space during game play.
- d. It is a Team Responsibility to define the tasks assigned to each competitor.
- e. If a Team has a Two Robot Entry, then:
 - i. Both competitors can be Robot Drivers
 - ii. Both competitors can also be Spotters for their partner driver
- f. If a Team has a One Robot Entry, then:
 - i. One competitor can be the Robot Driver and One competitor can be a Spotter for their partner driver

6.1 Starting Platform

- a. Each team area will have one starting platform.
- b. The starting platform measures 24 inches by 30 inches. Teams robots must start on top of the starting platform, and must not break the vertical plane created by the edges of the top platform.

- c. The platform is 4.25 inches above the court surface, and has a ramp on each side.
- d. The outside wall along the starting platform will have a raised section constructed by an additional 2x6 on top of the 2x6 exterior wall.
- e. The starting platform is located along the pathway which connects the 2 sides of the court.

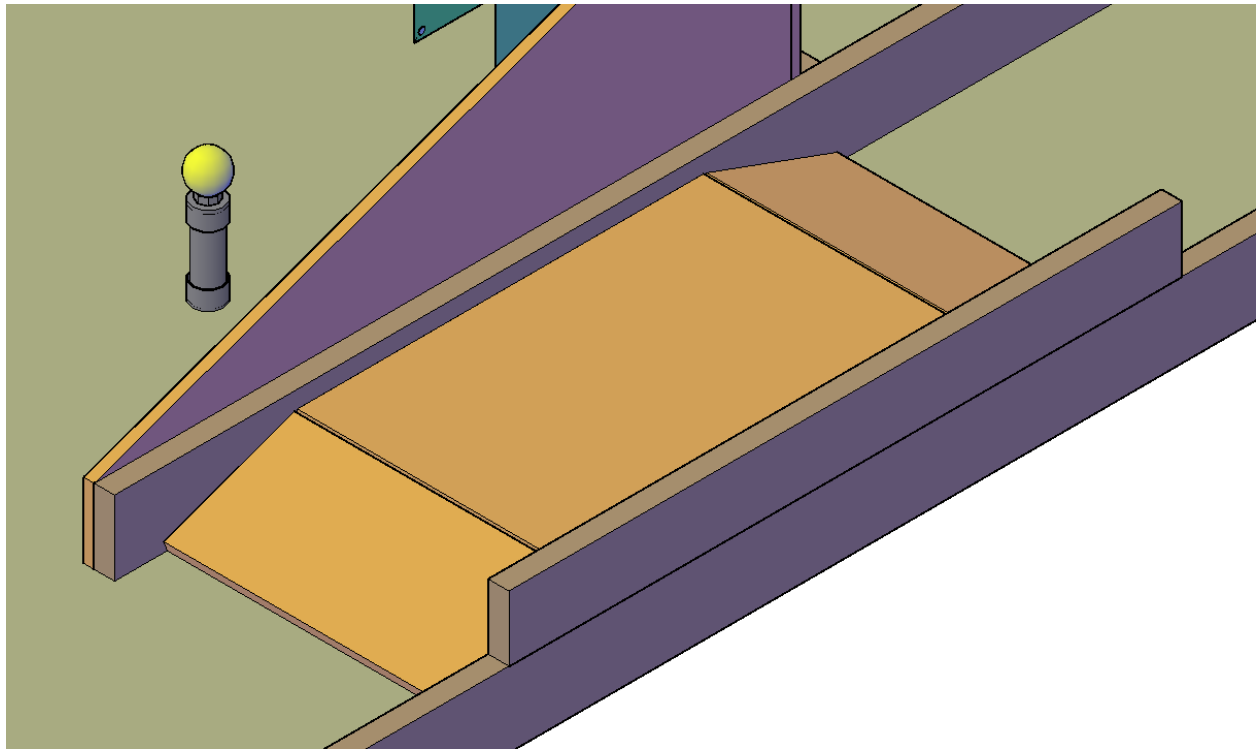


Figure 9: Starting Platform

6.2 Forest Area

- a. Each team will have access to one forest area, separated by a 24 inch high wall from the cabin building area.
- b. At the beginning of the match, the forest will contain 20 trees, standing upright in 3 rows.
 - i. Front row will contain 7 trees of 12 inches in length with an eye hook on each end (total measurement being approximately 14 inches)
 - ii. Second row will contain 6 trees of 10 inches in length with an eye hook on each end (total measurement being approximately 12 inches)
 - iii. Back row will contain 7 trees, alternating in height. The trees will appear in the order: 10 inch, 12 inch, 10 inch, 12 inch, 10 inch, 12 inch, 10 inch

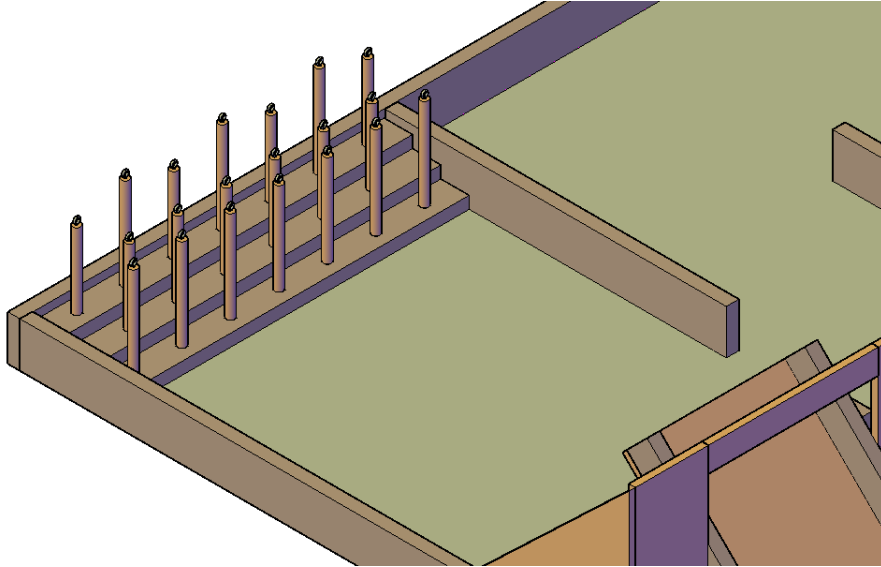


Figure 10: Forest Area

6.3 Cabin Building Area

- a. Each team will have access to one Cabin building area, separated by a 24 inch high wall from the forest area.
- b. The cabin building area includes 5 power pole obstacles, and one cabin foundation. See details above for these items.
- c. Teams will construct their cabins on the provided foundation.

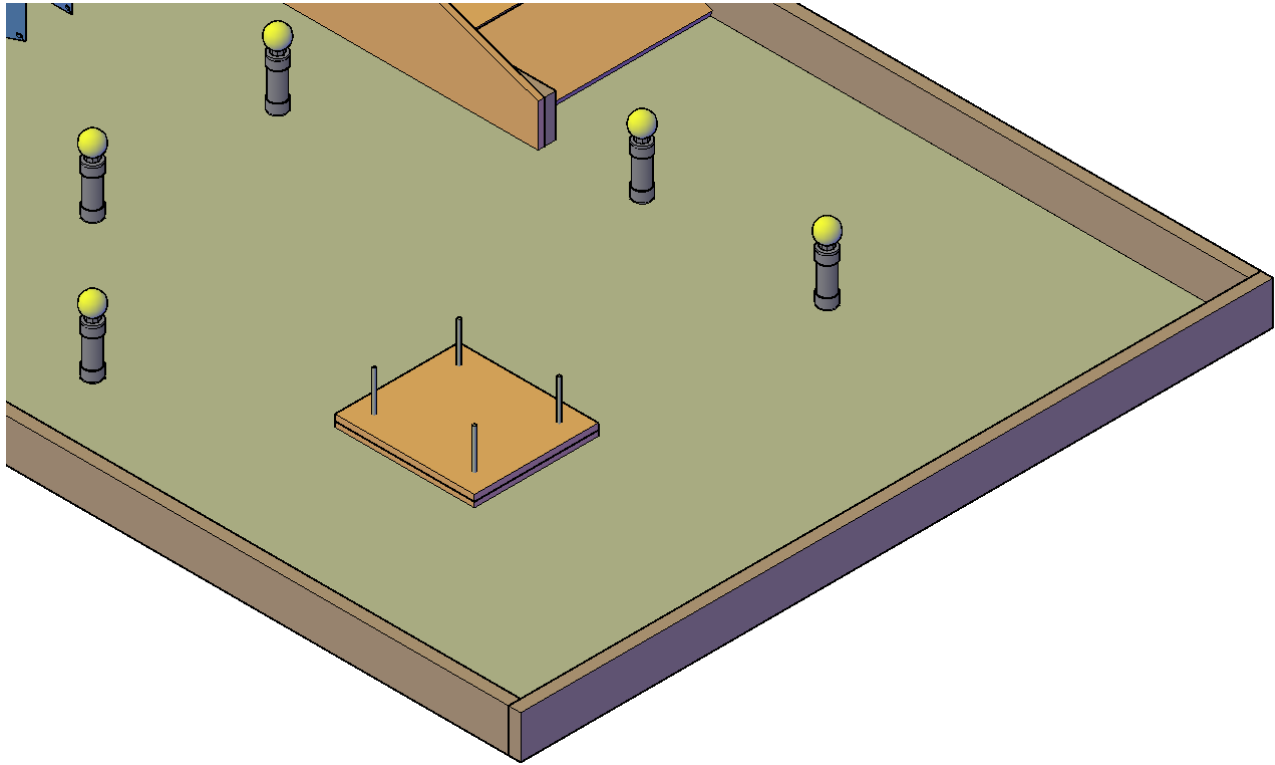


Figure 11: Cabin Building Area

6.4 River and Middle Wall

- a. Separating the forest area and the cabin building area is a wall standing 24 inches in height.
 - i. Robots are not allowed to reach over the wall.
 - ii. Trees are not allowed to be transferred over the wall.
- b. Located in the wall is the River, which provides a chute to send the trees from one side to the other.
 - i. The river is 18 inches wide.
 - ii. The river is at a 45 degree angle.
- c. The river is meant only for transportation of trees/logs from one side to the other.
 - i. Robots are not allowed to travel across the river to go from one area to the other.

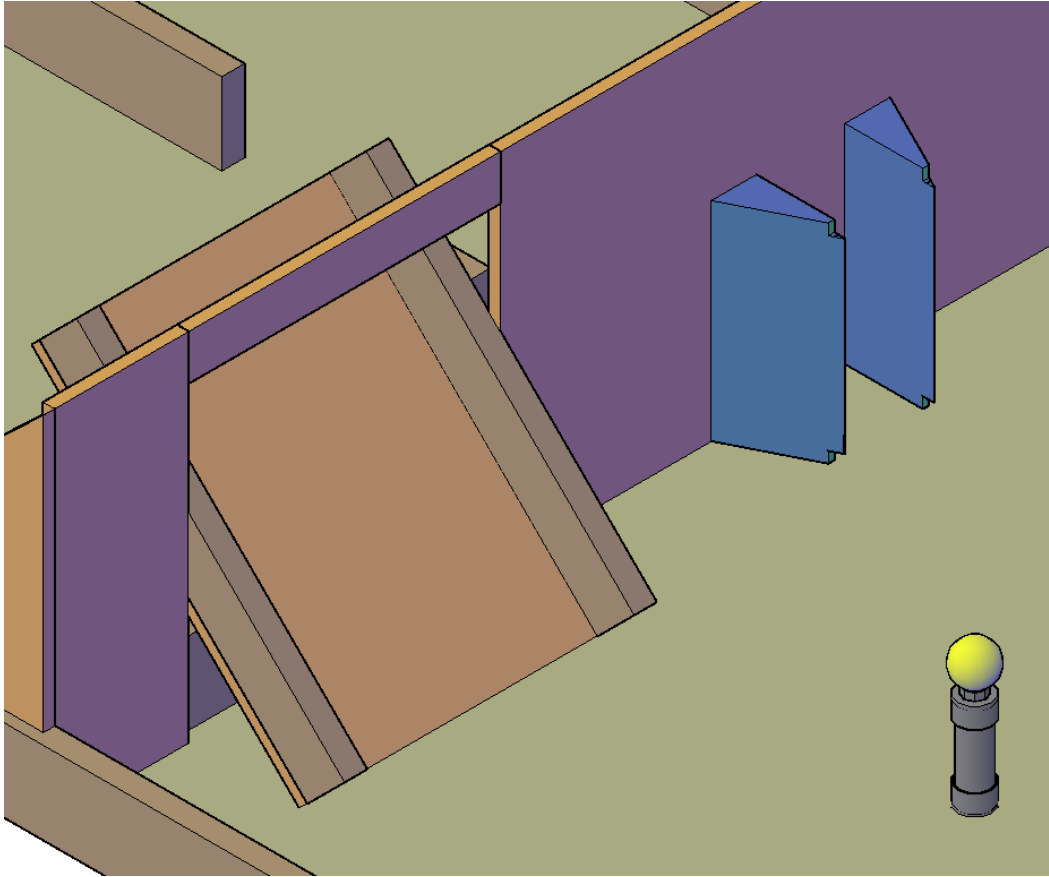


Figure 12: River and Middle Wall

7. Log Cabin Construction Game Description

- a. Games will involve one team at a time over virtual proctoring as outlined by the provincial office.
- b. Competitors are allowed unrestricted movement around the perimeter of their Team's Assigned Court Area.
- c. Teams can utilize a Maximum of TWO Tele-operated Robots.
- d. Teams may also use Independent Autonomous Element(s) as part of their entry (which must fit into the overall size limitation at the beginning of the game).
- e. Teleoperated Robots may NOT be in possession of any trees or components at the Start of a game.

8. Scoring Summary

Scoring will be done at the end of each 4 min. match.

8.1 Delivery Points

- a. One point will be awarded for each log successfully delivered onto the cabin building foundation.
- b. The log must be supported fully on the foundation for points to be awarded (it cannot be touching the court floor).
- c. Two points will be awarded for each Roof piece successfully delivered onto the cabin building foundation.

8.2 Log Cabin Building Points

- a. A complete Log Cabin has a maximum of 6 Levels and the point value awarded increases as you move up through the layers.
 - i. Pieces on level one must be Logs (the roof pieces must be on top of at least one completed wall level to count for construction points).
 - ii. Pieces on level 2-5 can be either Logs or Roof pieces.
 - iii. Pieces on level 6 can only be the Roof pieces.
- b. Pieces on the first level of a wall are worth 1 point.
- c. Pieces on the second level of a wall are worth 2 points.
- d. Pieces on the thirds level of a wall are worth 3 points.
- e. Pieces on the fourth level of a wall are worth 4 points.
- f. Pieces on the fifth level of a wall are worth 5 points.
- g. Pieces on the sixth level of a wall are worth 6 points.
- h. The Roof pieces will score as being on the level directly above the last fully completed wall level. For example, if you have 3 fully built wall levels and place the roof pieces on top, the roof pieces will count as they are on the fourth level.
- i. Once completed, teams will also get a single point awarded for completion.

8.3 Power Pole Points

- a. Competitors will be awarded points for Power Pole(s) which remain intact.
- b. 1 point will be awarded for each pole still standing.

- i. A pole is considered standing if the ABS pipe is still standing within the secured cap.
 - ii. The pole does not need to be standing fully upright, as long as it is still in the secured cap and being supported by the secured cap.
 - iii. If the pole is touching the court surface, it will not be considered standing.
- c. 1 point will be awarded for each tennis ball which remains on top of the power pole.
 - i. The tennis ball is considered on top of the power pole if it is fully supported by the power pole.
 - ii. If the tennis ball is touching anything else, it will not be considered supported by the power pole.
- d. The Power Pole Points will be awarded at the end of each match.
- e. If a Power Pole or Tennis ball becomes knocked over during a match, it is considered knocked over.
 - i. Competitors will not be allowed to rebuild these Power Poles. Once they are knocked over, they are no longer eligible for points.

8.4 Scoring Notes:

- a. The log cabin levels for each side are counted from the bottom most log placed on each side. For example, if three levels of logs are constructed on one side, and then a log is placed on an adjoining wall, the log on the adjoining wall would be counted as being on the first level.
- b. The points awarded based on the level a piece is placed in the Cabin are displayed in the Robot Marking Sheet Sample. Marks assigned increase by **ONE point per layer** as you move up the Cabin structure.
- c. Each robot may possess a **Maximum of ONE Piece** at a time.

9. Scoring Sheet

2021 Skills Alberta Robotics							
Log Cabin Construction Scoring Sheet							
Delivery				Cabin			
	Number of Pieces Delivered	Points per piece	Delivery Score		Number of Pieces	Points per piece	Score per level
Logs		x 1pt		Level 1 Logs		x 1pt	
Roof		x 2pt		Level 2 Pieces		x 2pt	
Total Delivery Score:				Level 3 Pieces		x 3pt	
				Level 4 Pieces		x 4pt	
Power Poles	Number intact	Points per standing	Power Pole Points	Level 5 Pieces		x 5pt	
Balls on top		x 1pt		Level 6 Pieces		x 6pt	
Poles standing	-	x 1pt		Completed Game?		+ 1pt	
Total Power Pole Score:				Total Cabin Score:			

Total Score:	
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Team Name:	Competitor Signature:
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2021 PROVINCIAL SKILLS CANADA COMPETITION



10. Pit Area and Court Access

- a. A pit area shall be provided at each student's home school area so that students may make repairs and improvements to their robots between games. **(Note: Teachers are not permitted in the pit area on competition day).**

11. Game Play

- a. Overall Standing will be based on the total number of points scored in all games played by each team.
- b. Teams will play a balanced number of Games.
- c. Teams will participate in an equal number of Games in the Round Robin Tournament.
- d. There may be Log Cabin Construction Playoff Games.
- e. Games will last 4 minutes.
- f. Between games, battery changes and repairs to robots may be completed at the team's assigned Pit Area Worktable.
- g. During the competition, protective safety glasses are expected to be worn while performing material removal tasks (cutting, drilling, etc.).
- h. During game play, virtual referees will have ultimate authority over virtual game rulings, and will have full authority over team conduct in the court area.
- i. Damaging the court area is prohibited. If a robot's design causes damage to the court elements, then it will not be allowed to compete until it can operate without causing damage. Games missed due to this situation will be forfeited. NOTE: Damage involves BREAKING court components. Robots bumping into court components and causing them to shift position without breaking any court element will NOT be viewed as damaging the court. It is expected that all court components will be fixed firmly in place so that the court is a Neutral Factor in the competition.

- j. Games will start on time. Teams are responsible to know when their games are scheduled. Teams arriving late will be allowed to use the remainder of the time in the game. Competitors cannot enter onto the court surface or adjust their robot during a game.
- k. If a robot is mal-functioning and represents a hazard to participants, other robots or itself in the opinion of the Referee, then, the referee may stop the clock, and may authorize the shutting off the robot during a game. Disabled robots or parts of robots not generating any safety concerns will be left on the court until the game time expires.
- l. It is a Team Decision what roles team members will fill. Drivers are the competitors holding the robot controller(s) and asserting direct control over a Tele-operated robot.
- m. The Spotter would be the competitor providing navigational guidance to the driver.
- n. Competitors may change roles while a game is in progress.
- o. Competitors (Driver/s and/or Spotters) can move freely in their Assigned Courtside Team Area throughout the game.
- p. Competitors may not enter an opponent team's Assigned Courtside Team Area at any time during game play.
- q. At the start of a game, robots are expected to be in their Designated Starting Position.
- r. Robots arriving AFTER a game has started will be allowed to enter the game and use the time remaining in the 4 min. game.
- s. Robots must not leave the contest court at any time during a game.
- t. It will be a referee's ruling that decides if an 'End of the Game Component Placement' took place before or after the game-ending buzzer sounded.
- u. If a Log or Roof piece falls out of the court, it may not be retrieved and will be considered out of the game for the remainder of the game time.
- v. Scoring will take place after the End of the Game Buzzer
- w. No aerial (flying) robots are allowed.
- x. More details on how virtual scoring will take place will be detailed in final contest description revision to be published.

12. Court Layout

- a. Please note: Although great pains will be made to keep each built court in compliance with the drawings, some inaccuracies in construction may occur. Since each court will be built by each individual school, inaccuracies may also occur during the assembly process. **Please make your robot designs allowing for a possible 1/4 inch tolerance.**
 - i. The open court surface will consist of the facility floor **OR** the good side of Plywood Sheets **OR** the smooth side of Masonite Sheeting, whichever is preferred by the home school. No floor will be provided with the prepared court build.
 - ii. Detailed court information has been included in the Appendix A Section of this document.

13. The Robot(s) Restrictions

- a. All tele-operated Robots must pass a virtual pre-competition inspection for compliance with the safety and design rules before they will be allowed to participate in tournament games.
- b. **Note:** Robots must remain in compliance with these rules throughout the competition. If teams fall out of compliance with these rules, then they will not be permitted to compete and will forfeit all their scheduled games until they have corrected the problem.

14. Start of the Game Robot Status

- a. When a robot's main power is turned on prior to the start of a game the robot must be in an overall 'Idle State' and the following conditions must exist:
 - i. Robots must be stationary.
- b. Robots must be in their designated Starting Location.
- c. If Team Entries involve multiple Robots / Mechanisms, then all of them must fit within starting location and must be positioned to not exceed the allowed total 4 cu ft. volume per Team.
- d. All systems may be ON.
- e. Air System Circuits may be fully charged to 100 PSI and their compressors can be ON.

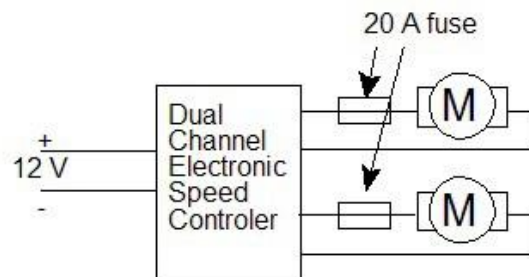
15. Overall Team Robot Entry Size

- a. Complete Team Entries must fit within the 24 by 30 inch starting at the start of each game, as defined by the vertical plane of the starting platform.
- b. Complete Team Entries must not exceed an overall size of 4 cubic feet (6,912 cubic inches) at the start of each game.
- c. Team Entries may expand to a larger size once a game has started.

16. Power Sources / Management

- The total voltage in any individual circuit cannot exceed 24 Volts.
- The maximum continuous power rating allowed in any circuit branch is 240 W, which will be limited by voltage and fuse selection. A larger main fuse can be used to provide protection for motor controllers. To calculate power in any given circuit, use the following formula: Power (Watts) = Voltage (Volts) x Current (Amps)

Acceptable Circuit Protection: (ESC is NOT protected by fuse)



Recommended Circuit Protection: (ESC IS protected by fuse)

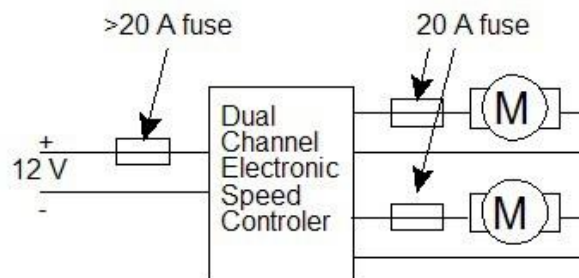


Figure 13: Circuit Protection

- Teams are reminded that it is the purpose of a fuse to protect the students themselves and the equipment in their circuits. Teams must develop circuit diagrams and calculate the appropriate values for all circuits on their robot. Teams must submit a wiring diagram of their robot's circuits. DUE APRIL 9, 2021
- Each current branch path from the battery must include either an in-line fuse, resettable fuse, circuit breaker, or be connected to a dedicated fuse in a rack.
- Batteries must be complete sealed commercial battery packs.

- f. ALL Robots must be able to be turned off with a single motion.
- g. Robot Controller receivers may be in an independent circuit.
- h. No explosive materials of any kind may be used (ether, gunpowder, acetylene etc.)

17. Non-Electrical (Battery) Energy Sources

- a. Pressure based energy sources (air or other) may be pre-charged to a maximum of 100-PSI pressure in their reservoirs (cylinders) at the start of each game.
- b. Air pressure systems using Competitor-made or modified air pressure hardware are NOT permitted.
- c. All pressurized tanks on robots must have a pressure gauge to indicate the stored pressure and a form of automatic overpressure safety relief system.
- d. The pressure tanks and related gauges / controls must be shielded from damage due to collisions or flying target objects.
- e. The stored pressure in the tank must not exceed a maximum of 100 PSI at any time.
- f. Tension-based energy sources (elastics, springs or other) may be in either a relaxed at rest state or in a tense / compressed state at the start of each game.
- g. Laser devices are prohibited.

18. Recommended Robot Controllers

- a. It is recommended (not required) that all teams use 2.4 GHz “non-crystal” control systems on Tele-operated Robots.
- b. Teams are allowed the use of an unlimited number of channels, but only two separate tele-operated robots. Teams assume full responsibility if any interference is to occur with their respective communication systems that could render the robot(s) useless.
- c. Tele-operated Robots may not transmit audio/visual information to off the robot devices. (Ex: Having a camera transmit images real time to a computer near the driver, etc.)

19. Pit Area

- a. Competitors MUST wear safety glasses when doing fabrication work involving material removal processes (grinding / cutting).

- b. Only registered competitors are permitted in the contest space.
- c. Designated teacher/industry team advisors are permitted in the pit area only to inspect the worktable setup of their team prior to the start of the tournament.
- d. Designated teacher/industry team advisors are not allowed in the pit area during tournament play.
- e. Teachers and industry advisors are not permitted to handle tools or robot parts while the competition takes place. Students must affect all repairs and modifications on their robot.
- f. It is required that teams fabricate a tabletop stand for holding their robot(s) in the pit area. This stand or these stands should hold the robot(s) securely and be capable of preventing the robot(s) from driving on or off the table in the case of either deliberate motor testing during repairs or due to random, unexpected motor activity.

20. Overall Court Description:

- a. The Court Playing Surface will be a 8' by 16' square.
- b. Individual Exclusive Use Team Spaces are 8' by 16' rectangles.
- c. The Perimeter Court Walls will be made using 2 by 6-inch planks.
- d. This wall will as a result will be approximately 5.5 inches tall.
- e. The court surface may vary between melamine, concrete, hardboard, or plywood, based on the preference of the local school.

21. Pre-inspection for Compliance with Safety and Design Rules

- Mandatory Wiring Diagram provided.
- Tabletop Robot Stand
- Overall volume $\leq 4 \text{ ft}^3$ or $6,912 \text{ in}^3$
- No explosives/combustibles
- No lasers
- All batteries are sealed commercial batteries in good physical condition
- Batteries wired in series should be the same amp hour rating (ex. both 1500 mAh) and batteries in parallel are of same voltage (ex. both 12 volts).
- Batteries securely mounted
- Total voltage in any individual circuit does not exceed 24V
- No circuit **branch** exceeds 240W (Voltage x Fuse Current Rating, easily accessible)
- All circuits have a fuse or breaker (breakers must have **DC rating**) and all Fuses / Breakers must be readily accessible.
- Mandatory Pressure System Circuit Diagram provided.
- No Competitor-made or modified air pressure hardware being used.
- Only commercially manufactured Pressure Tanks (cylinders) can be used.
- Pressure indicator
- Pressure in tanks does not exceed 100 psi
- Over-pressure safety valve
- Pressure tanks and related gauges and controls are shielded from damage due to collisions
- Robot can be turned off with a single motion.** Radio receivers / Logic circuits may be independent of the kill switch.
- Control unit to support operator to robot communication are being used.
- Demonstration of robot functionality

Additional concerns: _____

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Robot Evaluator Signature

Team Representative Signature

ADDITIONAL INFORMATION

Skills Canada Alberta Regional and Provincial Rules and Regulations

[Regional and Provincial Rules and Regulations](#)

Competitor Registration

Registration for Provincial Skills Canada Competition (PSCC) will open online at <https://portal.skillsalberta.com/> on January 12, 2021 at 8:30 AM.

Lunch

Lunch will be provided by Skills Canada Alberta

Virtual Awards Ceremony

The Virtual Awards Ceremony will take place **Thursday, May 13th at 6:30PM**. A link will be made available on the website with additional information.

Team Alberta Information

Team Alberta will be selected from competition Gold medalists who will then be eligible to participate at the Skills Canada National Competition (SCNC) in a virtual format May 25-30, 2021. It is recommended that competitors review the SCNC contest description to be familiar with the national contest description and project at <http://www.skillscanada.com/>.

Ethical Conduct

We recognize that participants will be competing individually in their own unique environments. We expect all competitors to compete fairly, respecting and abiding by the established rules in the true spirit of Skills Canada Alberta.

Letter of Participation

Competitors who participate in the 2021 Provincial Skills Canada Competition are eligible for a Letter of Participation that can be downloaded on the Registration Portal after the competition ends.

COMMITTEE MEMBERS
