

Activity	Student Robotics Competition	Location	Southampton University		Likelihood	Likelihood rating	Severity	Severity rat	Risk rating: Category	Tolerability	Comments
Assessors	Alistair Lynn Josh Perriman Thomas Scarbrook Will Barber	Event dates	Start	End	Very unlikely	1	First Aid injury/illness	1	1-2 Very low	Acceptable	No further action is necessary other than to ensure that the controls are maintained.
	01/04/23		02/04/23	Unlikely	2	Minor injury/illness	2	3-4 Low	Acceptable	No additional controls are required unless they can be implemented at very low cost (in terms of time, money and effort).	
Date assessed	27/2/23				Likely	3	3 day injury/illness	3	5-7 Medium	Tolerable	Consideration should be given as to whether the risks can be lowered, where applicable, to a tolerable level, and preferably acceptable level, but the costs of additional risk reduction measures should be taken into account. The risk reduction measures should be implemented within a defined time period.
					Fairly likely	4	Major injury/illness	4	8-14 High	Tolerable	Substantial efforts should be made to reduce the risk. Risk reduction measures should be implemented urgently within a defined time period and it might be necessary to consider suspending or restricting the activity, or to apply interim risk control measures, until this has been completed. Considerable resources might have to be allocated to additional control measures.
					Very likely	5	Fatality/disabling injury	5	15+ Very high	Unacceptable	Substantial improvements in risk control are necessary, so that risk is reduced to a tolerable or acceptable level.
Who is at risk	Description										
Competitors	A competitor (16-19 year old) who is involved in the risk activity										
Team Supervisors	A named Team Supervisor (responsible adult) for the team who is involved in the risk activity										
Volunteers	Someone working on behalf of Student Robotics who is involved in the risk activity										
Third Parties	Someone not involved in the risk activity. This may include competitors, team supervisors, volunteers, or event visitors.										
Hazard	Description	Who is at risk	Likelihood	Severity	Risk Factor	Controls	Likelihood	Severity	Risk factor	Responsible person	
Injury while using manual or power tools	Inappropriate use of tools resulting in tools slipping and/or breaking and thereby injuring the user or those nearby.	Competitors Team Supervisors Third Parties	3	3	9	Tools should only be used when appropriate and in the manner they are designed to be used. Team Supervisors to supervise all tool use by teams. All use by Volunteers should be by a competent adult. Loose hair or clothing to be tucked in or removed whilst operating tools. Teams reminded in advance that they should provide their own safety gear along with tools. Student Robotics will not provide any tools to Competitors. Safety gear may be provided. First aid provision available to manage any incidents.	2	2	4	Team Supervisors SR Health and Safety Coordinator	
Interaction with robots: electric shock	Robots operate from battery power, and outputs can be enabled/disabled autonomously. Mishandling of the battery, circuitry, or wiring can result in an electric shock and potential burns. Mishandling the battery can be severe due to the high current capacity of the battery, the wiring in the kit has potential for harm reduced due to the kit providing current limiting.	Competitors Team Supervisors Volunteers	2	4	8	Team Supervisors to supervise work on robots in team pits. Robots must be powered down and placed within the team pits if left unsupervised. Robots must be powered down when being inspected or handled by a volunteer. Robots are required to provide a housing for the battery to protect it from mechanical damage. Robot wiring is to be kept away from moving parts to prevent damage. The battery must connect only into the Student Robotics Power Board which is capable of cutting the power off from the rest of the robot. A readily available and obvious power off button connected to the Student Robotics Power Board must be accessible from the top of the robot. Additional power sources used on the robot must be approved beforehand, and must provide an easy and safe cutoff mechanism, obvious and accessible from the top of the robot. All voltages within robots to be within SELV limits (120VDC, 50VAC maximum). Robots subject to a safety inspection at the beginning of the competition and randomly throughout the event. Teams will be required to rectify any potentially dangerous areas of their robots, and may be prevented from competing until they do so. Food and drink to be stored in sealed containers.	1	4	4	Team Supervisors SR Health and Safety Coordinator	
Interactions with robots: burns	Parts of the robot heat up due to electrical energy dissipation or friction. This might result in a minor burn on the skin.	Competitors Team Supervisors Volunteers	2	3	6	All Student Robotics circuit boards are housed in a protective casing. Team Supervisors to supervise work on robots in team pits. Robots must be powered down and placed within the team pits if left unsupervised. Volunteers should inspect a robot to identify any potential risks before handling. Robots must be powered down when being inspected or handled by a volunteer unless necessary, in which case the robot must be inspected for risks prior to handling. Power outputs from the Student Robotics kit are limited.	1	3	3	Team Supervisors SR Health and Safety Coordinator	
Interaction with robots: other injuries	Robots are constructed by competitors and can have sharp edges. Also the robots are constructed with moving parts, often powered autonomously, which can result in cuts or limbs being crushed. Due to the typical low power of the robots cuts are likely to be minor and crushing likely to result in little more than bruising.	Competitors Team Supervisors Volunteers Third parties	4	2	8	Team Supervisors to supervise work on robots in team pits. Robots must be powered down and placed within the team pits if left unsupervised. Robots must be immobilised when being inspected or handled by a volunteer. A readily available and obvious power off button connected to the Student Robotics Power Board must be accessible from the top of the robot. Additional power sources used on the robot must be approved beforehand and must provide an easy and safe cutoff mechanism, obvious and accessible from the top of the robot. Robots subject to a safety inspection at the beginning of the competition and randomly throughout the event. Teams will be required to rectify any potentially dangerous areas of their robots, and may be prevented from competing until they do so.	2	1	2	Team Supervisors SR Health and Safety Coordinator	
Injury to Competitors, SR Volunteers, and Visitors due to unsafe robots	Robots may behave in unsafe ways, either inherently or due to performing something typically safe but in inappropriate circumstances. Examples include a sharp edge being exposed, or a projectile being launched towards observers.	Competitors Team Supervisors Volunteers Third parties	3	2	6	Robots subject to a safety inspection before entry into an arena. Robots re-inspected randomly throughout the event, entry into the arena or access to batteries can be revoked at any time. Anyone identifying a potential safety issue to report it to the safety inspector. Arena access controlled by SR Volunteers, maximum of 4 teams at a time, and modification of robots inside the arena is not permitted (this also applies to the test arena). Power cut off switch to be readily accessible on robots.	1	1	1	SR Health and Safety Coordinator	
Electric shock from battery sources	Unsuitable use of battery powered equipment, or the use of damaged battery powered equipment or cabling, resulting in low voltage (<120VDC, <50VAC) electric shock	Competitors Team Supervisors	3	3	9	All powered equipment to be used when appropriate and in the manner they are designed to be used. Damaged equipment to be retired from use. No wires to be exposed on batteries or chargers.	1	3	3	Team Supervisors	
Electric shock from mains sources	Unsuitable use of mains equipment, or the use of damaged mains equipment or cabling, results in a high voltage high current electric shock	Competitors Team Supervisors Volunteers Third parties	2	4	8	Mains equipment and cabling to be appropriately rated and fused. All powered equipment to be used when appropriate and in the manner they are designed to be used. Mains cabling to be kept off the floor in regular and high use walkways. Mains cabling to be secured down and inspected at intervals for damage. All Student Robotics mains equipment used to be visually inspected before use. Damaged equipment to be retired from use.	1	4	4	Team Supervisors SR Health and Safety Coordinator	
Injury from improper manual handling	Improper handling technique, or moving of equipment with insufficient people results in the individual handling causing personal injury. Handling of equipment unsafe for manual handling resulting in cuts or other physical injury. Nearby third parties getting injured by moving equipment, or crushed by dropped equipment.	Competitors Team Supervisors Volunteers Third parties	3	3	9	Team Supervisors to supervise their teams. Volunteers involved in manual handling trained and briefed. Manual handling only performed within an individual's ability. Handling to be broken down into manageable chunks where possible and appropriate. Appropriate protective equipment provided, if applicable. Heavy equipment not to be moved in busy areas. Robots not to exceed 16kg.	2	2	4	Team Supervisors SR Health and Safety Coordinator	
Slips, trips, and falls	Obstructions or liquids on the floor resulting in a person falling, potentially whilst carrying equipment. This can potentially result in bruises or broken bones.	Competitors Team Supervisors Volunteers	3	4	12	Extension leads secured down and inspected regularly. Cabling and equipment kept off the floor in regular and high use walkways. Team Supervisors to enforce teams keeping their pit areas tidy. Carrying of robots or large or heavy objects on the stairs to be kept to a minimum. Running is not permitted. Any identified slip or trip hazards to be signed and removed as soon as possible.	2	2	4	Team Supervisors SR Health and Safety Coordinator	
Battery failure - smoke, fire	The lithium polymer (LiPo) batteries used within the robots have the potential if mistreated to ignite and become a self-sustaining fire. Smoke released from this combustion is potentially harmful if inhaled.	Competitors Team Supervisors Volunteers Third parties	1	5	5	All batteries to be charged in fire-proof bags and by trained volunteers. Robots to provide isolated enclosure for installed batteries to protect against crushing or puncturing damage. Competitors and Team Supervisors have been informed about safe use of the batteries throughout the competition year. SR Volunteers and Team Supervisors to identify batteries showing signs of damage or swelling and deliver to Helpdesk for safe disposal.	1	3	3	Team Supervisors SR Health and Safety Coordinator	
Injury moving robots into/out of the arena	Robots have to be lifted into and out of the arena, involving lifting a potentially large and heavy robot over the arena wall and over and around arena components which may present trip hazards. Time limitations require robots to be powered up at time of arena entry, potentially allowing unexpected robot movement.	Competitors Volunteers	3	3	9	Doors into arena clearly marked, and any potential trip hazards highlighted with hazard tape. During matches, Competitors are not allowed in the arena whilst the robots are in motion. Robots to be immobilised whilst entering and exiting the arena, and in the staging area. Individuals carrying robots reminded not to rush, support provided or the carrying prevented if insufficient time is available. Student Robotics volunteers to intervene if handling is deemed unsafe.	1	3	3	SR Health and Safety Coordinator	
Injury due to persons or objects falling from height	A person on the ground is injured by a person or object falling from a height	Competitors Team Supervisors Volunteers Third parties	3	4	12	Arena to be constructed and tested as per Method Statement, and will be subject to inspection by SR Volunteers throughout the event, with interventions for repair if deemed necessary. Work at height only conducted by suitably trained and equipped individuals. Work at height only to be performed where absolutely necessary. Personnel clipped on where appropriate. Tools on lanyards where appropriate. Head protection to be worn when at height or underneath ongoing work at height where appropriate. Areas in which work at height is being performed to be restricted. Physical barriers to be used where objects are at risk of being pushed over the edge of barriers or ledges. Leaning over barriers or ledges at heights not permitted. Objects are not to be passed down from heights where an alternative route is available. Objects are not to be passed down from heights where an alternative route is available.	1	3	3		
Injury to a person due to falling from height	A person working at height falls and injures themselves on the way down/ landing	Volunteers	2	5	10	Work at height only conducted by suitably trained and equipped individuals. Work at height only to be performed where absolutely necessary. Personnel clipped on where appropriate. Leaning over balconies or ledges at heights not permitted.	1	3	3		
Hearing damage from excessive noise levels	Exposure to sounds at too great a volume for an extended period causing damage to the listeners hearing	Third parties	2	3	6	Avoid use of excessive volumes. Noise levels monitored during event.	1	3	3	SR Health and Safety Coordinator	
Reaction to theatrical effects utilised, such as lighting effects	Theatrical effects causing shock, or epileptic (or similar) fits.	Third parties	2	3	6	Signage to be clearly visible in areas where theatrical effects are used. Flashing lights and smoke to be kept to a minimum. Any flashing to be at no greater rate than 4 flashes per second.	1	3	3	SR Health and Safety Coordinator	
Accidents due to fatigue from working long hours	Fatigue induce poor judgement resulting in unknown task-specific accidents causing injury to the individual undertaking the task or those nearby. Severity set to max level 5 due to unpredictability of what task may be affected.	Competitors Team Supervisors Volunteers Third Parties	3	5	15	Team Supervisors to supervise their teams. Volunteers suspected of excessive tiredness restricted from activities that may be consequently dangerous. Volunteers encouraged to take breaks. Opportunity and space for volunteer breaks available.	1	2	2	Team Supervisors SR Health and Safety Coordinator	
Accidents due to being under the influence of alcohol or drugs	Alcohol or drug induced poor judgement or erratic behaviour resulting in unknown accident causing injury to the individual under the influence of those nearby. Severity set to max level 5 due to unpredictability of what may happen.	Third Parties	2	5	10	Team Supervisors to supervise their teams. Alcohol consumption prohibited on site. Anyone under the influence of alcohol or illegal drugs will be escorted off site. Anyone under the influence of medication that impairs their judgement to be restricted from activities that may be consequently dangerous.	1	0	0	Team Supervisors SR Health and Safety Coordinator	

COVID-19	Attendees catching COVID-19 and becoming ill.	Third Parties	2	3	6	Anyone experiencing symptoms of COVID-19, or who has tested positive for COVID-19 in the 7 days beforehand asked to not attend. Hand sanitisation stations available throughout and attendees encouraged to use them. Attendees reminded to be respectful of others personal space.	1	3	3	Team Supervisors SR Health and Safety Coordinator
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Activity	Competition setup and teardown	Location	Southampton University	Likelihood	Likelihood rating	Severity	Severity rat	Risk rating: Category	Tolerability	Comments
Assessors	Alistair Lynn Josh Perriman Thomas Scarsbrook Will Barbee	Event dates	Start: 30/03/23 End: 03/04/23	Very unlikely	1	First Aid injury/illness	1	1-2 Very low	Acceptable	No further action is necessary other than to ensure that the controls are maintained.
Date assessed	15/10/22			Unlikely	2	Minor injury/illness	2	3-4 Low	Acceptable	Consideration should be given as to whether the risks can be lowered, where applicable, to a tolerable level, and preferably acceptable level, but the costs of additional risk reduction measures should be taken into account. The risk reduction measures should be implemented within a defined time period.
				Likely	3	3 day injury/illness	3	5-7 Medium	Tolerable	Substantial efforts should be made to reduce the risk. Risk reduction measures should be implemented urgently within a defined time period and it might be necessary to consider suspending or restricting the activity, or to apply interim risk control measures, until this has been completed. Considerable resources might have to be allocated to additional control measures.
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				Very likely	5	Fatality/disabling injury	5	15+ Very high	Unacceptable	
Who is at risk	Description									
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Team Supervisors	A named Team Supervisor (responsible adult) for the team who is involved in the risk activity									
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Hazard	Description	Who is at risk	Likelihood	Severity	Risk Factor	Controls	Likelihood	Severity	Risk factor	Responsible person
Injury while using manual or power tools	Inappropriate use of tools resulting in tools slipping and/or breaking and thereby injuring the user or those nearby.	Volunteers Third Parties	3	3	9	Tools should only be used when appropriate and in the manner they are designed to be used. All use should be by a competent adult. Loose hair or clothing to be tucked in or removed whilst operating tools. Safety gear to be provided where appropriate. First aid provision available to manage any incidents.	2	2	4	SR Health and Safety Coordinator SR Setup and Teardown Coordinator
Electric shock from battery sources	Unsuitable use of battery powered equipment, or the use of damaged battery powered equipment or cabling, resulting in low voltage (<120VDC, <50VAC) electric shock	Volunteers	3	3	9	All powered equipment to be used when appropriate and in the manner they are designed to be used. Damaged equipment to be retired from use. No wires to be exposed on batteries or chargers.	1	3	3	SR Health and Safety Coordinator SR Setup and Teardown Coordinator
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Injury from improper manual handling	Improper handling technique, or moving of equipment with insufficient people results in the individual handling causing personal injury. Handling of equipment unsafe for manual handling resulting in cuts or other physical injury. Nearby third parties getting injured by moving equipment, or crushed by dropped equipment.	Volunteers Third parties	3	3	9	Volunteers involved in manual handling trained and briefed. Manual handling only performed within an individuals ability. Appropriate protective equipment used, if applicable. Heavy equipment not to be moved in busy areas. Any equipment over 16kg to be handled by multiple persons.	2	2	4	SR Health and Safety Coordinator SR Setup and Teardown Coordinator
Slips, trips, and falls	Obstructions or liquids on the floor resulting in a person falling, potentially whilst carrying equipment. This can potentially result in bruises or broken bones.	Volunteers Third parties	3	4	12	Extension leads secured down and inspected regularly, kept away from walkways where reasonably practicable. Signage to be used when cabling is not yet able to be secured down. Equipment to be kept out of walkways where reasonably practical. Carrying of large or heavy objects on the stairs to be kept to a minimum. Running is not permitted. Any identified slip or trip hazards to be signed and removed as soon as possible.	2	2	4	SR Health and Safety Coordinator SR Setup and Teardown Coordinator
Battery failure - smoke, fire	The lithium polymer (LiPo) batteries used within the robots have the potential if mistreated to ignite and become a self-sustaining fire. Smoke released from this combustion is potentially harmful if inhaled.	Volunteers Third parties	1	5	5	All batteries to be charged in fire-proof bags and by trained volunteers. SR Volunteers to identify batteries showing signs of damage or swelling and safely dispose of them.	1	3	3	SR Health and Safety Coordinator SR Setup and Teardown Coordinator
Injury due to persons or objects falling from height	A person on the ground is injured by a person or object falling from a height	Volunteers Third parties	3	4	12	Arena to be constructed and tested as per Method Statement, and will be subject to inspection by SR Volunteers throughout the event, with interventions for repair if deemed necessary. Work at height only conducted by suitably trained and equipped individuals. Work at height only to be performed where absolutely necessary. Personnel clipped on where appropriate. Tools on lanyards where appropriate. Head protection to be worn when at height or underneath ongoing work at height where appropriate. Areas in which work at height is being performed to be restricted. Physical barriers to be used where objects are at risk of being pushed over the edge of barriers or ledges. Leaning over barriers or ledges at heights not permitted. Objects are not to be held over barriers or ledges. Objects are not to be passed down from heights where an alternative route is available.	1	3	3	SR Health and Safety Coordinator SR Setup and Teardown Coordinator
Injury to a person due to falling from height	A person working at height falls and injures themselves on the way down/landing	Volunteers	2	5	10	Work at height only conducted by suitably trained and equipped individuals. Work at height only to be performed where absolutely necessary. Personnel clipped on where appropriate. Leaning over balconies or ledges at heights not permitted.	1	3	3	SR Health and Safety Coordinator SR Setup and Teardown Coordinator
Hearing damage from excessive noise levels	Exposure to sounds at too great a volume for an extended period causing damage to the listeners hearing	Third parties	2	3	6	Avoid use of excessive volumes. Noise levels monitored during event.	1	3	3	SR Health and Safety Coordinator SR Setup and Teardown Coordinator
Reaction to theatrical effects utilised, such as lighting effects	Theatrical effects causing shock, or epileptic (or similar) fits.	Third parties	2	3	6	Theatrical effects to be limited to the minimum required for setup and testing. Clear announcement of theatrical effects to be made immediately beforehand in areas where theatrical effects are used. Flashing lights and smoke to be kept to a minimum. Any flashing to be at no greater rate than 4 flashes per second.	1	3	3	SR Health and Safety Coordinator SR Setup and Teardown Coordinator
Accidents due to fatigue from working long hours	Fatigue induce poor judgement resulting in unknown task-specific accident causing injury to the individual undertaking the task or those nearby. Severity set to max level 5 due to unpredictability of what task may be affected.	Volunteers Third Parties	3	5	15	Volunteers suspected of excessive tiredness restricted from activities that may be consequently dangerous. Volunteers encouraged to take breaks. Opportunity and space for volunteer breaks available.	1	2	2	SR Health and Safety Coordinator SR Setup and Teardown Coordinator
Accidents due to being under the influence of alcohol or drugs	Alcohol or drug induced poor judgement or erratic behaviour resulting in unknown accident causing injury to the individual under the influence of those nearby. Severity set to max level 5 due to unpredictability of what may happen.	Third Parties	2	5	10	Alcohol consumption prohibited on site. Anyone under the influence of alcohol or illegal drugs will be escorted off site. Anyone under the influence of medication that impairs their judgement to be restricted from activities that may be consequently dangerous.	1	0	0	SR Health and Safety Coordinator SR Setup and Teardown Coordinator