# Assignment 2

## UTS SAFE WORK METHOD statement (SWMS)

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| 1. **FACULTY/SUBJECT** | |
| Faculty/Subject title | 41013 Industrial Robotics |
| Subject supervisor/coordinator | Gavin Paul |
| SWMS prepared by | Lydia Angus, Shrimoyee Sen, Kyle Jewiss |

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| 1. **WORK ACTIVITY DESCRIPTION** | | | | | | |
| Describe the work activity E.g. Operating, Handling, Using.. Include names of hazardous equipment, substances or materials used,  and any quantities and concentrations of substance(s) or reaction products. | Operating UR5 robot to move groceries from both the shelf and other peoples hands/shopping cart into the robots basket..  The robot will be mounted on a trolley permanently and the trolley will move around a simulated shop. | | | | | |
| 1. HAZARDS: Choose those hazard types that will need to have control measures in Section 4 | | | | | | |
| **Work Environment**   * Working in Remote Locations * Working Outdoors/fieldwork * Clinical/Industrial setting * Poor ventilation/Air quality * Temperature extremes * Working at Height * Slip/Trip/Fall hazards | | **Plant**   * Noise * Vibration * Working with compressed air * Lifts Hoists or Cranes * Moving parts (Crushing,friction, cut, stab, shear hazards) * Pressure Vessels or Boilers | | **Chemical**   * Hazardous Chemicals use * Skin/eye irritant * Sensitiser * Mutagen * Carcinogen * Toxic to reproduction * Aquatic toxicity * Toxic * Corrosive * Dangerous when wet | | **Ergonomic/Manual Handling**   * Repetitive or awkward movements * Lifting heavy objects * Over reaching * Working above shoulder or below knee height * Poor workstation set up |
| **Electrical**   * Plug in equipment * High voltage * Exposed wiring * Exposed conductors | | **Radiation**   * Ionising Radiation * Non-ionising radiation (Lasers, Microwaves, Ultraviolet light) | | **Biological**   * Sharps/Needles * Cytotoxins * Pathogens/infectious materials * Infectious materials * Communicable diseases * Animal/insects * Work with fungi/bact/viruses | | **Psychosocial**   * Aggressive or violent clients/students * Working in isolation * Working with timeframes * Staffing issues |
| 1. **CONTROLS MEASURES: Choose those that apply for hazards identified** | | | | | | |
| **Eliminate/Isolate/Substitute / Engineering Controls**   * Remove hazard * Restrict access * Redesign equipment * Guarding / Barriers / Fume Cupboard / exhaust * Biosafety cabinet * Use safer materials/substances * Ventilation * Regular maintenance of equipment * Redesign of workspace / workflow | | | **Admin specific: Licenses/permits Work Methods**   * Training Information or Instruction * Licensing or certification of operators * Test and tag electrical equipment * Restricted access * Regular breaks * Task rotation * Work in pairs * Document Chemical risk assessment * Ladder / Sling register | | **Emergency Response Systems**   * First aid kit * Chemical spill kit * Safety shower * Eye wash station * Emergency Stop button * Remote Communication Mechanism | |
| **Other controls not listed** | | | | | | |
| 1. **PPE REQUIRED (Tick those that apply)** | | | | | | |
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| 1. **EMERGENCY EQUIPMENT** | | | | | | |
| http://www.orr.uts.edu.au/images/pictograms/equipment/eyewash.pnghttp://www.orr.uts.edu.au/images/pictograms/equipment/spill.pnghttp://www.orr.uts.edu.au/images/pictograms/equipment/shower.png | | | | | | |
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| 1. **work activity steps** |
| **before you start:**   * Check you know where the emergency stop button is located * Ensure someone else is in the room before starting working with the robot * Check the robot’s workspace is clear and there’s nothing in the robot’s workspace it could catch on or unsafe substances such as food or drink or overhead elements * Check that the robots are mounted firmly and there are no loose bolts * Check all wiring is safely stored under the table   **steps in work activity:**   1. Place the bricks, ensuring they’re within the workspace 2. Start the robots 3. Watch the robots as they complete the tasks   **emergency procedures:**   * Press emergency button * Notify security or dial 6 using the UTS internal phone   **training required:**   * Complete induction to the workroom * Complete induction on safe use of the robots |

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| 1. **sign off** | | |
| **prepared by:**  **NAME: Lydia Angus, SHRIMOYEE SEN**  **KYLE JEWISS** | **Lab Supervisor**  **Name: Michael Lee** | **Date: 26/04/22**  **Review Date:** |

## Risk Assessment

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| **Work area / operation** | CB11.10.403 | | **Assessor’s name** | Lydia Angus, Shrimoyee Sen, Kyle Jewiss | | | |
| **Other persons consulted** |  | | | | **Date of safety assessment** | | 26/04/22 |
| Subject Coordinator’s Name | Gavin Paul | Lab Supervisor’s Name | | | | Michael Lee | |

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| **ACTIVITY**  - Describe hazardous activities related to the work area or operation. | **ASSOCIATED HAZARDS** | **INHERENT RISK**  - Harm that could occur from these hazards if controls fail or are not in place. | **EXISTING CONTROL MEASURES** | **PROPOSED CONTROL MEASURES**  - Proposed action to minimise risk to an acceptable level. | **TARGET DATE**  - To implement proposed controls | **RESIDUAL RISK LEVEL** (H,M,L) |
| Unattended use of the robot | Robot could collide with each other or the table | Collison could cause mechanical damage to the robots or workspace, and could start an electrical fire or introduce the risk of electrical shock if the cabling is damaged | Robot will have collision detection programming based on sensors mounted on the end effector and surrounding the trolley | Emergency stop button | During workshop setup | L |
| Using inappropriate load on the robot | Overloading the robot | Causing mechanical damage to the robot | The robot is only to be used for the approved intended brick payload. | Gripper weight is to be 3kg or less | During workshop setup | L |
| Liquids spilling on cables | Electrical shorts or electrocution | Electrical shorts to the robots or electrocution of people within the work area | No liquids allowed within the lab | Cables to be reticulated under the robot to a battery located within the trolley | During workshop setup | L |
| Gripper and Accessories fitting | Gripper or robot accessories not attached to the robot properly | Gripper could become detached and damage the equipment, payload or operator | Gripper installation to be checked by a second operator and a safe movement simulation to be run to ensure that the gripper is correctly installed. |  | During workshop setup | L |
| Trip Hazard | Cables connecting to the robots | Operators could trip and injury themselves or the equipment | Robots mounted on a trolley with a batter located in the base. Cables to be neatly reticulated underneath. |  | During workshop setup | L |
| Robot arm moves incorrectly | Robot could collide with the table, other robot or operator | Collision could damage equipment, start an electrical fire, injure operator | Simulate robot operation prior to use of the robot. | Provide electrical fire extinguisher. Ensure everyone with access to the robots has completed an induction in their use. Include collision prevention within simulation code.  Robot is only to be used if 2 people are present to ensure that 1 person can press the emergency stop button if the other is in danger | During workshop setup | L |

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| **Approval of assessment** | I am satisfied that the residual risk with existing controls is acceptable X Yes ☐No  OR  I am satisfied that that the proposed controls will reduce risk to an acceptable level. X Yes ☐No | Signature |  | Date | 26/04/22 |

A picture containing diagram

Description automatically generated