JOB SAFETY ANALYSIS –

Demonstration of ROV upon the request of Sustainable Development Goals that, while not specific to the Decade of the Ocean, offer a blueprint to achieve a better and more sustainable future for all by building

design and build a remotely operated vehicle and the necessary sensors and tooling to support work to combat climate change, provide clean energy, feed our growing global population, monitor ocean health, preserve our maritime history,

Company :	Kwok Tak Seng Inc.
School :	Kwok Tak Seng Catholic Secondary School
NAME OF DEPARTMENT :	IT SCHOOL TEAM
Team name and No :	KTS-WaterLoong

TITLE OF JOB OR TASK: ENSURING PUBLIC SAFETY , MAINTAINING HEALTHY WATERWAYS AND PRESERVING HISTORY

TASK	HAZARDS	CONTROLS	PERSON-IN-CHARGE
1.Construction of ROV	1a) Potential injury to body parts due to unaware of small sharp fragments 1b) Potential tripping hazard on objects from ROV or tools 1c) Potential injury via inappropriate use of tools 1d) Potential operation risk ● Cut by pointy or sharp part of tools ● Burn by corrosive chemicals ● Breath in toxic substance ● Radiation from machines	1a-1. Tidy the workstations regularly 1b-1. Keep all items securely attached to the ROV 1b-2. Return tools to appropriate position after using 1c-1. Avoid carelessness and pay attention when using the tools 1c-2. Use the right tool for the task 1c-3. Make sure tool users are qualified to use the hand tools 1d-1. Ensure proper PPE is worn by all members 1d-2. Wash hands after handling corrosive or toxic chemical and avoid unnecessary contact with skin and face 1d-3. Maintain an appropriate distance when the machines are operating	Cheung Man Ho
2. Assembling equipment at poolside control station	2a) Potential damage to mission-critical equipment through mishandling 2b) Potential injury to extremities of poolside crew members via dropping equipment	2a-1. Carefully lift the equipment and special care to breakable items 2a-2. Ensure equipment is carried by proper crew members 2b-1. Ensure proper PPE is worn by all poolside crew members 2b-2. Develop and follow a safety checklist	Karel Cheung
3.Connecting electrical equipment and ROV to the control box	3a) Potential damage to the equipment and ROV due to incorrect connection of wires and cause short circuit 3b) Potential injury to poolside crew members via electrical discharge	3a-1. Double check power connections, fuses and tubing connection 3b-1. Members briefed on how to 'break down' safely 3b-2. Ensure all crew members are properly grounded and wearing correct PPE 3b-3. Double check that the power is switched off before connecting	Leung Shek Man
4. Connecting control box to external power and ROV surface tether	4a) Potential injury to poolside crew members via electrical discharge 4b) Potential damage to ROV system via voltage overload	4a-1. Double check power connections 4a-1. Notice poolside crew members before connecting 4b-2. Check voltage of the power source before connecting to the ROV	Karel Cheung
5. Transfer physical ROV from station to poolside	5a) Potential injury to poolside crew members though dropping heavy components 5b) Potential slipping hazard to crew members via wet floor	5a-1. Develop and follow a safety checklist 5a-2. Carry the ROV and tether cables by separate crew member 5a-3. Ensure all crew members are extremely cautious when handling ROV, taking care to mind all tether cables and other hazards 5b-1. Beware of the slippery floor	Law Pak Chun

		5b-2. Ensure proper PPE is worn by all poolside crew members	
6. Dry run of ROV	6a) Potential injury to crew members due to unaware of sharp or moving parts of the ROV 6b) Potential damage to ROV thrusters through running aquatic thrusters in open air	6a-1. Stick danger labels for moving objects and sharp parts 6a-2. Cover or eliminate sharp edges 6a-3. Cover two ends of Propellers with the shrouds 6a-4. Notice poolside crew members before testing 6b-1. Ensure ROV thrusters are not run at high speeds while in open air	Cheung Karel
7. Putting the ROV into water	7a) Potential danger to the poolside crew though falling into water 7b) Potential damage to the ROV though sudden tension on surface tether 7c) Potential injury to poolside crew members via electrical discharge	7a-1. Maintain at least 1 meter away from the poolside 7a-2. Crouch down when working near the poolside 7b-1. Lower the ROV with two members slowly 7b-2. Address a member responsible for the release and retrieve of the tether 7c-1. Ensure all wires/cables/plugs are properly insulated, and connected to the correct components	Cheung Man Ho
8. Operating of the ROV	8a) Potential tripping hazard to poolside crew due to the communicating cable between land and water across the deck 8b) Potential slipping hazard to crew members via wet floor 8c) Exposed bare wire or motor may disconnect under tension 8d) Loosen components of the ROV may fall off 8e) Unauthorized person operating the ROV without permission, causing injuries to himself and damage the ROV	8a-1. Choose a brightly colored shroud for the tether to be easier to spot and avoid 8a-2. Place all wires to the side of the pool deck, far away from the main path or evacuation pathway 8b-1. Avoid running or jumping near the pool. 8b-2. Put sign to alert others 8b-3. Ensure proper PPE is worn by all poolside crew members 8c-1. Seal all the connecting points between wire and motor 8c-2. Extend the motor protecting case to cover the intercept of the wire and motor 8c-3. Add cable strain relief to the exposed wire ends 8d-1. Keep all items securely attached to the ROV 8d-2. Test the attachment of the components on land 8e-1. Only allow pilots who hold the operation key of the control panel to operate the ROV 8e-2 the key switch will only be switch on after passing the safety checking of the ROV, to prevent wrong start up process (plug	Cheung Karel

		the cable into wrong plug hole)from damaging the ROV and operator.	
9. Retrieving the ROV	13a) Potential damage to ROV via struggle of tether cable 13b) Potential injury to poolside crew members via handling heavy object 13c) Potential injury to crew members due to sharp or moving parts of the ROV	13a-1. Retract the tether cable slowly and have a person in charge 13b-1. Retrieve the ROV with at least two crew members 13c-1. Stick danger labels for moving objects and sharp parts 13c-2. Cover two ends of Propellers with the shrouds	Karel Cheung
10. Packing and disconnecting the ROV	14a) Potential injury to crew members via exposed bare wire 14b) Potential injury to crew members via handling heavy object 14c) Potential injury to poolside crew members due to high pressure	14a-1. Seal all the connecting points between wire 14b-1. Develop and follow a safety checklist 14b-2. Carry the ROV and tether cables by separate crew member 14b-3. Ensure all crew members are extremely cautious when handling ROV, taking care to mind all tether cables and other hazards 14c-1. Range responsible crew member to disconnect the air pump and the lift bag	Law Pak Chun

Required Personal Protective Equipment(PPE)
● Closed-toed, non-slip shoes ● Protective gloves ● Non-loose clothing

Other Information:	http://ehs.berkeley.edu/how-do-i-write-and-update-job-safety-analysis-jsa https://www.marinetech.org/files/marine/files/ROV%20Competition/2015%20files/HSE_Handbook_number_3_As_of_11_19_2013_AW.pdf http://www.safetyworksmaine.com/safe_workplace/safety_management/hazard_analysis.html
Contributors:	KTSCSS IT School Team and robotics members
Created:	April 2024
JSA Library Number:	NA
	For more information about this JSA, contact the Mentor of Kwok Tak Seng Catholic Secondary School – Mr. S.F. Lee in 892-26059033 http://www.ktscss.edu.hk