



VORTEX

JOB SAFETY

ANALYSIS

Task	Potential consequence	Risk Control measures	Responsible Person (s)	Initial
Developing The ROV				
Accessing tools	<ul style="list-style-type: none"> Tripping over random tools, cables, or junk 	<ul style="list-style-type: none"> Return everything to its proper place after use, and do regular lab maintenance. 	All Members	Safety keeper ----- Sign:
Applying sealant	<ul style="list-style-type: none"> Eye injury Respiratory irritation Skin injury 	<ul style="list-style-type: none"> Wear proper PPE. Have ample ventilation. Keep compound away from the skin. 	Mechanical Team	Mechanical Leader ----- Sign:
Using hand tools (hacksaws, screwdrivers, hammers, etc.)	<ul style="list-style-type: none"> Eye injury Respiratory discomfort Skin injury 	<ul style="list-style-type: none"> Wear safety goggles when using saws. Wear gloves when using hand tools. Wear masks when needed 	Mechanical Team	Safety keeper ----- Sign:
Using power saws and power tools (power drills, etc.)	<ul style="list-style-type: none"> Ear injury Eye injury Skin injury Scalp injury 	<ul style="list-style-type: none"> Wear safety eyewear when using power tools. Wear masks as needed. Wear noise-reducing earmuffs to minimize exposure to high sound levels. Keep body parts away from moving blades and apply clamps as needed. Ensure saw maintenance and inspect for worn blades and malfunctions before use. 	Electrical Team	Safety keeper ----- Sign:
Pre-Launch				
Loading /Unloading the ROV	<ul style="list-style-type: none"> Toe damage back strain Slips / Falls Back strain Physical strain Foot injury 	<ul style="list-style-type: none"> Picking up heavy equipment with a natural lower back to prevent spinal disc injury lift heavy objects together avoid lifting anything above the shoulder 	All Members	Mechanical Leader ----- Sign:

Dry system operation test	<ul style="list-style-type: none"> ▪ Electrical fire from damaged components. ▪ Finger damage ▪ Eye Damage 	<ul style="list-style-type: none"> ▪ Inspect all hardware before test, run the propulsion system at low speed, have accessible fire extinguisher. ▪ Avoid placing fingers in motors. ▪ Evaluate the condition of the wires and replace cables when necessary. 	All Members	Department Leaders ----- Sign:
Setting Up The ROV Into Control Position				
Set up	<ul style="list-style-type: none"> ▪ Electrical shock or electrocution 	<ul style="list-style-type: none"> ▪ Never handle with wet hands, keep electrical appliances dry. ▪ Verify power switches and circuit breaker on Tether Control Unit. ▪ Visually inspect the cables and connectors to check if they have been tightened and sealed. ▪ Use the proper personal equipment in accordance with the supply voltage. 	All Members	Department Leaders ----- Sign:
Wet system operation test	<ul style="list-style-type: none"> ▪ Electrical shock or electrocution 	<ul style="list-style-type: none"> ▪ Check overall insulation and waterproofing elements 	Station Team	Station Leader ----- Sign:
Connecting The ROV				
Connecting the ROV	<ul style="list-style-type: none"> ▪ Electrocution ▪ Finger damage ▪ General trauma 	<ul style="list-style-type: none"> ▪ Avoid contact with exposed wires. Stop operation if detected. ▪ Power off when handling the ROV. Avoid placing fingers in motors ▪ Shoes with good traction. Tidy working area. Mark obstacles 	All Members	Electrical Leader ----- Sign:
Setting up compressor	Over-pressurized	<ul style="list-style-type: none"> ▪ Set pressure regulator to 275kpa. ▪ ensure no air leakage in the pneumatic fittings. ▪ Depressurize the compressor tank after using. 	Mechanical Team	Mechanical Leader ----- Sign:
Setting up and managing the tether	<ul style="list-style-type: none"> ▪ Loose tether ▪ Tangled tether ▪ Tether damage from pulling 	<ul style="list-style-type: none"> ▪ Connect the tether to the control box and the ROV, have one person in charge of cable. ▪ Wrap the tether properly around the tether transportation cart when going to or leaving the pool. ▪ Applying a proper strain relief. 	Tether man	Tether man ----- Sign:
Powering the ROV	<ul style="list-style-type: none"> ▪ Electric shock ▪ Overvoltage 	<ul style="list-style-type: none"> ▪ Follow company Safety Checklist Procedures when powering any equipment or machinery on. 		

		<ul style="list-style-type: none"> Check the voltage reading showing nominal 12v every time we set the power supply. Equipped Power supply with fuses to prevent overvoltage. Always keep power supply safely away from anybody or water. 	Electrical Team	Electrical Leader ----- Sign:
Putting The ROV Into Water				
Falling into the water	<ul style="list-style-type: none"> Drowning General trauma 	<ul style="list-style-type: none"> Avoid standing close to the water unless necessary, especially if you can't swim. Shoes with good traction. Tidy working area. 	ROV Assistant / Tether man	ROV Assistant ----- Sign:
<ul style="list-style-type: none"> Wrist injury from lifting heavy Slipping and falling on pool side Electrical fire from damaged components 		<ul style="list-style-type: none"> Use proper lifting techniques and share loads if possible. Wear non-slippery shoes, stay low and keep body down. Check overall insulation and waterproofing elements. 	All Members	Safety keeper ----- Sign:
ROV Retrieval				
Falling into the water	<ul style="list-style-type: none"> Drowning 	<ul style="list-style-type: none"> Avoid standing close to the water unless necessary, especially if you can't swim. 	ROV Assistant / Tether man	ROV Assistant ----- Sign:
Entangled in tether	<ul style="list-style-type: none"> Fall into water. 	<ul style="list-style-type: none"> Proper tether management, avoid loops in tether 	ROV Assistant / Tether man	ROV Assistant ----- Sign:
Fingers in motors	<ul style="list-style-type: none"> Finger damage 	<ul style="list-style-type: none"> Power off when handling the ROV. Avoid placing fingers in motors 	ROV Assistant / Tether man	ROV Assistant ----- Sign:

Required / Recommended Trainings	Required Personal Protective Equipment (PPE)
<ul style="list-style-type: none"> Sealing Processes Document. Safety Checklist Procedure training Power supply operations training Loading and unloading equipment Soldering operations training Proper operation of heavy machinery and power tools 	<ul style="list-style-type: none"> Non-Slip Shoes Eye Protection - Protective goggles Life Jacket Face Mask Safety gloves - Tear resistant non-conductive gloves Close-toed shoes Noise-blocking earmuffs