



JOB SAFETY ANALYSIS



DEVELOPING, MANAGING AND OPERATING THE COUSTEAU		
	HAZARDS	RECOMMENDATIONS
Pre-launch		
Unpacking of ROV control panel	Back injury from lifting heavy loads	Use proper lifting techniques and share loads if possible
	Tripping over unpacking materials	Make sure the workplace is clean, setup according to station design with clear duty division, keep an eye on the tether
	Toe and foot injury from dropping items	Ensure a tight hold on ROV before lifting it, wear shoes.
Carrying ROV to operation zone	Back injury from lifting heavy loads	Use proper lifting techniques and ask for helping hands if needed
	Limbs injury from using incorrect carrying techniques	Ensure a tight hold on ROV before lifting it, grab by designated locations. Wear shoes.
Connect power to ROV	Electrical shock or electrocution	Never handle with wet hands, keep electrical appliances dry, keep electrical components insulated.
Connect supporting system to ROV	Trip over wires	Setup according to connection design with clear duty division, keep an eye on the wires.
Dry system operation test	Electrical fire from damaged components	Inspect all hardware before test, run the propulsion system at low speed, have accessible fire extinguisher.

	Poisonous smoke from electrical fire	Test under good ventilation conditions.
	Hands injury from accidental contact with propeller blade	Warn before test to raise awareness, label all hazards clearly on ROV.
Wet system operation test	Electrical shock or electrocution	Check overall insulation and waterproofing elements.
Launching and removing ROV in/from water	Back strain from improper gesture	Kneel down and keep back straight, avoid twisting, use proper lifting techniques and share loads if possible.
	Wrist injury from lifting heavy	Use proper lifting techniques and share loads if possible.
	Slipping and falling on pool side	Wear non-slippery shoes, stay low and keep body down.
Transportation of ROV	Impact injury from being hit or ran over by cart	Keep the way clean and move slow, beware of people suddenly coming from other direction.
	Tripping on tether or transported item falling off the cart	Have cargo tied, watch out for tether.
Setting up the ROV	Electrical shock or electrocution	Make sure the ROV is placed on a dry location and hands are dry at all times. 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.
	Injury from slipping	Wear non-slip footwear to avoid slipping.
Launching		
Operating and Retrieving the ROV	Back / muscle strain and injury	Do not over reach for the ROV. Avoid sharp twisting movements. Slightly bend your body forward when loading or unloading the ROV.
	Put warning signs / stickers on the thrusters.	Put warning signs / stickers on the thrusters. Make sure thrusters are disabled and / or power is shut off to the vehicle before putting hands and fingers near thrusters.
Utilization of heavy machinery, hand tools and power tools	Mild electrical shock or electrocution	Inspect for damaged wires / connectors before retrieving the ROV. Evaluate the condition of the wires and replace cables when necessary.
	Ear injury	Wear noise blocking earmuffs to reduce exposure to high sound levels.
	Eye injury	Wash hands after using power tools while minimizing contact with face. Wear protective goggles to prevent foreign objects (e.g. sparks, particulate matter) from damaging eyes.
	Flesh wound or dismemberment	Check any machinery and tools for any loose parts or malfunctions before use. Do not put any parts of the body in close proximity of moving blades.
	Short-term respiratory irritation and long-term respiratory damage	Wear gas masks to prevent inhalation of particulate metallic matter.

Setting up the tether	Loose tether	Connect the tether to the control box and the ROV, have one person in charge of cable.
	Tangled tether	Wrap the tether properly around the tether transportation cart when going to or leaving the pool.
Managing the tether	Tether damage from pulling	Have one person in charge of supplying tether to prevent the ROV from pulling on the tether.
	Injury from tripping on the tether	Make sure tether is laid without tangling and does not hinder walking/
Developing the ROV		
Accessing tools	Tripping on miscellaneous tools, cables and/or rubbish	Have working space organized, have equipment stored in designated places
Utilization of construction tools	Injury from damaged expendables	Do not exceed life estimate of working surfaces, have them changed regularly. Wear correct PPE.
Construction of thrusters	Pinch hazard points, damage on propellers, equipment or people	Keep safe distance from rotating elements, wear correct PPE. Sufficient shrouding around propeller.
Applying sealant	Eye, skin and respiratory system irritation	Wear correct PPE. Have sufficient ventilation. Keep compound away from skin.

Required Personal Protective Equipment (PPE): for all work on or around the ROV and its peripheries	Required Training:
<ul style="list-style-type: none"> • Close toed non-slip shoes • Safety gloves - Tear resistant non-conductive gloves and Gas masks (for use with potentially hazardous substances) • Protective clothing • Life jackets • Protective goggles • Sun protection equipment (If outdoors) 	<ul style="list-style-type: none"> • Loading and uploading procedures • Power checking and set-up procedures • Proper operation of specific tools • Proper operation of air pump • Proper operation of heavy machinery and power tools • Practice transporting/handling/servicing ROV
Other Information: For more detail, see «Cousteau» Technical Documentation	