

# Risk assessment process for occupational dive work example

Record of risk management process to be carried out in accordance with the Work Health and Safety Regulation 2011.

<b>Date of assessment:</b>
<b>Date/times of work:</b>
<b>Work to be undertaken for:</b>
<b>Work to be undertaken:</b>
<b>Site location:</b>

<b>Name of person conducting risk assessment process</b>	<b>Competency determined by</b>

<b>Names of divers participating in underwater diving work</b>	<b>Competency determined by</b>
1.	
2.	
3.	
4.	
5.	
6.	

<b>Name of all other people involved in the work</b>	<b>Role</b>
1.	
2.	
3.	

## Probability scale

Level	Description	Example
6	Almost certain	Almost always occurs
5	Likely	Expected, occurs repeatedly
4	Probable	Not a surprise, will occur several times
3	Possible	Could occur sometimes
2	Remote	Unlikely, though conceivable
1	Improbable	So unlikely that the probability is close to zero

## Severity scale

Level	Description	Example
6	Extreme	Multiple deaths
5	High	Death
4	Moderate	Major injury
3	Low	Injury causing a person to lose over three days work
2	Very low	Injury causing a person to lose less than three days work
1	Not significant	No significant injury

## Risk rating table

		Hazard - severity					
		6	5	4	3	2	1
Risk - probability of occurrence	6	36	30	24	18	12	6
	5	30	25	20	15	10	5
	4	24	20	16	12	8	4
	3	18	15	12	9	6	3
	2	12	10	8	6	4	2
	1	6	5	4	3	2	1

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Assess the probability of each hazard occurring and the severity of the consequences if that hazard occurs, based on the assessment tables above.

If the risk assessment produces a 'risk rating' above nine (area in light blue) no diving should take place, until additional control measures are implemented to reduce the risk.

When preparing the risk assessment refer to the following checklist of occupational diving related issues, mechanisms of injury and physical factors which can lead to harm.

The list is not intended to be exhaustive, nor will every item relate to every workplace. You should conduct risk assessments for work tasks and manage the risks you find.

### Risk assessment and control measures

Level of diver competence							
Identified hazard	Assessed severity	Assessed probability	Assessed risk	Risk control	Post control severity	Post control probability	Assessed risk after control
No proof of competence	5	5	25	<ul style="list-style-type: none"> <li>Qualifications register maintained.</li> <li>Copies of each divers' appropriate proof of competency held.</li> </ul>	4	2	8
Inexperience with the specific system of work	5	5	25	<ul style="list-style-type: none"> <li>Induction procedures to ensure familiarity with the systems of work, including in water familiarisation.</li> <li>Ongoing review, training and drills.</li> </ul>	4	2	8

Environmental conditions							
Identified hazard	Assessed severity	Assessed probability	Assessed risk	Risk control	Post control severity	Post control probability	Assessed risk after control
Strength and direction of wind (consider emergency response)	4	4	16	<ul style="list-style-type: none"> <li>Surface support to monitor conditions and recall divers if adverse conditions occur.</li> <li>Assessed daily with the dive plan.</li> <li>Sites chosen to reduce the impact from wind.</li> <li>Diving aborted in dangerous conditions.</li> <li>Abort diving when forecasted wind is &gt;33knots.</li> </ul>	3	3	9
Surface conditions	4	4	16	<ul style="list-style-type: none"> <li>Surface support to monitor conditions and recall divers if adverse conditions occur.</li> <li>Assessed daily with the dive plan.</li> <li>Sites chosen to reduce the impact from wave action.</li> </ul>	3	3	9

				<ul style="list-style-type: none"> <li>Abort diving where the wave height is &gt; 2m.</li> </ul>			
Current and tide	4	3	12	<ul style="list-style-type: none"> <li>Assessed daily with the dive plan.</li> <li>Consider adjusting the dive schedule to allow for diving at slack tide.</li> <li>Abort diving when currents are &gt;2knots.</li> </ul>	3	2	6
Underwater visibility	3	3	9	<ul style="list-style-type: none"> <li>Assessed daily with the dive plan.</li> <li>Buddy separation distances reduced.</li> <li>Divers conducting tethered (SSBA) diving.</li> </ul>	3	2	6
Entrapment hazard	5	3	15	<ul style="list-style-type: none"> <li>Divers carry a knife to free themselves from entanglements.</li> <li>Divers avoid entrapment situations.</li> </ul>	3	2	6
Depth of worksite	4	3	12	<ul style="list-style-type: none"> <li>Divers not to exceed maximum planned depths.</li> <li>Times reduced when operating at deeper sites.</li> </ul>	4	2	8
Water temperature	4	2	8	<ul style="list-style-type: none"> <li>Divers wear suitable exposure protection for the conditions.</li> </ul>	2	2	4
Time of day	3	4	12	<ul style="list-style-type: none"> <li>All diving to be completed prior to 5pm.</li> <li>Night diving only permitted with approval from the operations manager.</li> </ul>	3	2	6
Underwater terrain	3	3	9	<ul style="list-style-type: none"> <li>Monitor depths.</li> <li>Consider the effects on dive profiles from moving over ridges and coral bommies.</li> </ul>	3	2	6
Atmospheric temperature and humidity	3	4	12	<ul style="list-style-type: none"> <li>Provide shaded areas or PPE.</li> <li>Hydration policy.</li> </ul>	2	3	6
Contaminants	4	3	12	<ul style="list-style-type: none"> <li>Consider additional PPE) if contaminants are present.</li> </ul>	3	3	9
Isolation of dive site	5	3	15	<ul style="list-style-type: none"> <li>Daily radio checks.</li> <li>Communications systems functioning properly.</li> <li>Test emergency plans to ensure they are effective.</li> <li>Check First aid, oxygen and defibrillator .</li> </ul>	3	3	9

Task related conditions							
Identified hazard	Assessed severity	Assessed probability	Assessed risk	Risk control	Post control severity	Post control probability	Assessed risk after control
No system to monitor and maintain diving plant (e.g. air supply, secondary air supply, emergency air supply, personal protective equipment, air hose and attachments and weight system)	5	4	20	<ul style="list-style-type: none"> <li>Dive equipment serviced as per manufacturers recommendations.</li> <li>Divers to carry a redundant air source.</li> <li>Hydrostatically test all cylinders every 12 months.</li> <li>Divers have a quick release weight system.</li> <li>Pre-dive equipment checks conducted.</li> <li>All diving equipment to be in working order.</li> <li>Check compressor daily and service annually with oil and filters changed as required.</li> <li>Check air hoses daily for damage prior to use and service annually.</li> <li>Divers carry a Surface Marker Buoy and audible signalling device.</li> </ul>	4	2	8
No safe system of work to assess diving personnel (e.g. number of divers, fitness, competence, roles, responsibilities, and duties)	4	4	16	<ul style="list-style-type: none"> <li>Surface support in place at all times and solely engaged as the lookout.</li> <li>All divers confirm that they are fit to dive daily.</li> <li>Induction procedures to ensure divers have the requisite fitness and have been shown how to complete the work.</li> <li>Qualifications register maintained.</li> </ul>	4	2	8
No safe systems of work (e.g. decompression management systems, dive planning, communications, logging of dives, equipment inspection and maintenance and record keeping)	4	4	16	<ul style="list-style-type: none"> <li>No decompression diving conducted unless prior approval from the operations manager is granted.</li> <li>All dives conducted using approved dive computers.</li> <li>A dive plan is completed for each day's diving.</li> <li>Dive supervisor conducts a safety briefing prior to the commencement of diving operations.</li> <li>All dives recorded on the dive log and</li> </ul>	3	2	6

				<p>checked by the dive supervisor.</p> <ul style="list-style-type: none"> <li>• Each diver keeps a personal log of dives.</li> <li>• Crew qualifications, dive medical and equipment register maintained.</li> </ul>			
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Hyberbaric/physiological hazards							
Identified hazard	Assessed severity	Assessed probability	Assessed risk	Risk control	Post control severity	Post control probability	Assessed risk after control
Frequency of diving, including repeat diving and multi day diving	4	3	12	<ul style="list-style-type: none"> <li>• Ensure a decompression management system is adhered to.</li> <li>• Divers to drive dory one day in five to allow for a dry rest period.</li> <li>• Maximum five dives a day or 250 mins per diver.</li> <li>• Minimum 40 minutes surface interval between dives.</li> </ul>	4	2	8
Depth of dive	4	3	12	<ul style="list-style-type: none"> <li>• Maximum depth of 30m unless pre-approved by the operations manager.</li> <li>• Dive computers downloaded and profiles checked for all dives deeper than 20m.</li> </ul>	4	2	8
Duration of dive	4	3	12	<ul style="list-style-type: none"> <li>• Maximum dive time of 70 minutes unless pre-approved by the operations manager.</li> </ul>	4	2	8
Breathing gas	6	3	18	<ul style="list-style-type: none"> <li>• Air tests conducted every three months on all compressors</li> <li>• Air intake pipes situated away from engine emissions.</li> <li>• If using mixed gases, ensure people hold the qualifications for using and blending that gas.</li> </ul>	4	2	8
Exertion required to reach dive site	3	3	9	<ul style="list-style-type: none"> <li>• Consider use of tenders, float lines and rest stations where exertion is required to reach the dive site.</li> </ul>	2	2	4
Exertion required to conduct task	3	3	9	<ul style="list-style-type: none"> <li>• Increase the safety factor (reduce depths and times) when exertion is required to perform a task.</li> <li>• Set dive computers to a more conservative algorithm using in built</li> </ul>	2	2	4

				<ul style="list-style-type: none"> <li>conservative factors.</li> <li>Consider engineering controls to reduce task related exertion.</li> </ul>			
Excessive noise	3	3	9	<ul style="list-style-type: none"> <li>Reduce workload of noisy machinery.</li> <li>Consider insulating noisy machinery.</li> <li>Schedule noisy machinery use outside of work hours.</li> </ul>	3	2	6
Immediate pre-dive fitness	4	4	16	<ul style="list-style-type: none"> <li>Divers confirm health status prior to diving with dive supervisor.</li> <li>Drug and alcohol policy in place.</li> <li>Option of dry work in the event of minor illness.</li> </ul>	3	2	6
Altitude exposure	3	2	6	<ul style="list-style-type: none"> <li>No flying for 24hrs after multiple dives over multiple days</li> <li>Assess routes to accommodation do not exceed 300m in altitude</li> </ul>	2	2	4
Fatigue	4	3	12	<ul style="list-style-type: none"> <li>Fatigue management policy in place.</li> <li>Consider loss of sleep and hours worked.</li> </ul>	3	2	6

Associated activities hazards							
Identified hazard	Assessed severity	Assessed probability	Assessed risk	Risk control	Post control severity	Post control probability	Assessed risk after control
Manual handling	4	4	16	<ul style="list-style-type: none"> <li>Minimise lifting by divers.</li> <li>When lifting is necessary use proper lifting techniques.</li> <li>Consider engineering controls.</li> <li>Minimise heavy work for diver's post dive.</li> </ul>	3	3	9
Boat handling	5	3	15	<ul style="list-style-type: none"> <li>Qualified personnel.</li> <li>Induction records and ongoing training in the operation of a vessel.</li> <li>Propeller guards installed on all tenders.</li> </ul>	4	2	8
Dive site entry	3	3	9	<ul style="list-style-type: none"> <li>Entry points suitably designed to allow safe entry of the divers and equipment.</li> </ul>	3	2	6
Dive site egress	4	3	12	<ul style="list-style-type: none"> <li>Egress point allows diver to exit quickly and without additional strain.</li> <li>Consider rescue requirements and emergency plans.</li> </ul>	4	2	8
Crane / winch operations	4	3	12	<ul style="list-style-type: none"> <li>Qualified personnel.</li> <li>Voice communications to diver when</li> </ul>	4	2	8

				retrieving underwater loads.			
Rigging	4	3	12	<ul style="list-style-type: none"> <li>Diver slinging loads holds a dogging ticket (DG).</li> <li>Voice communications with the crane operator.</li> </ul>	4	2	8
Topside plant	3	3	9	<ul style="list-style-type: none"> <li>Maintenance, inspecting and monitoring of whole surface supply system.</li> </ul>	3	1	3
Dive platform	4	3	12	<ul style="list-style-type: none"> <li>Ensure platform is kept tidy and free of obstacles.</li> <li>Hydraulic systems checked regularly.</li> </ul>	4	2	8

<b>Other hazards</b>							
<b>Identified hazard</b>	<b>Assessed severity</b>	<b>Assessed probability</b>	<b>Assessed risk</b>	<b>Risk control</b>	<b>Post control severity</b>	<b>Post control probability</b>	<b>Assessed risk after control</b>
Storage of cylinders	5	3	15	<ul style="list-style-type: none"> <li>Store cylinders according to contents.</li> <li>Oxygen cylinders to be stored in a clean grease free environment away from any ignition source and restrained accordingly.</li> </ul>	4	2	8
Dangerous marine animals	5	2	10	<ul style="list-style-type: none"> <li>Jellyfish PPE</li> <li>Sharks and crocodiles – observations, local knowledge, shark shields.</li> </ul>	4	2	8
Non associated boat traffic (small craft)	5	3	15	<ul style="list-style-type: none"> <li>Dive flag and radio communications</li> <li>Surface support in place</li> </ul>	4	2	8
Shipping movements	5	3	15	<ul style="list-style-type: none"> <li>Dive flag and radio communications.</li> <li>Surface support in place.</li> </ul>	4	2	8
Water inlets	5	3	15	<ul style="list-style-type: none"> <li>Controls to prevent a diver from being drawn into an intake where there is a differential in pressure (e.g. cages, tethers, lock out procedures for turbines).</li> <li>Consider the use of remotely operated vehicles (ROVs).</li> </ul>	4	2	8
Water outfalls	3	2	6	<ul style="list-style-type: none"> <li>Consider the effect of the outfall on currents and contamination.</li> </ul>	2	2	4
Water pressure differentials	5	3	15	<ul style="list-style-type: none"> <li>Controls to prevent a diver from being drawn into an intake where there is a differential in pressure (e.g. cages, tethers, lock out procedures for turbines).</li> </ul>	4	2	8



				<ul style="list-style-type: none"> <li>Consider the use of Remotely Operated Vehicles.</li> </ul>			
Use of hazardous substances	4	3	12	<ul style="list-style-type: none"> <li>Chemical register, safety data sheets, PPE and trained personnel.</li> </ul>	3	2	6
Existing in water chemical pollutants	5	2	10	<ul style="list-style-type: none"> <li>PPE appropriate to the type of contamination.</li> <li>Decontamination procedures.</li> <li>Trained personnel.</li> <li>Consider the use of ROVs.</li> </ul>	4	2	8
Existing in water biological pollutants	5	2	10	<ul style="list-style-type: none"> <li>PPE appropriate to the type of contamination.</li> <li>Decontamination procedures.</li> <li>Trained personnel.</li> <li>Consider the use of ROVs.</li> </ul>	4	2	8
Explosives	5	2	10	<ul style="list-style-type: none"> <li>Trained personnel.</li> <li>Consider the use of ROVs.</li> <li>Contact defence personnel.</li> </ul>	5	1	5
Hazards peculiar to dive site	5	3	15	<ul style="list-style-type: none"> <li>To be addressed in the dive plan and divers briefed accordingly.</li> </ul>	4	2	8

Emergency response factors							
Identified hazard	Assessed severity	Assessed probability	Assessed risk	Risk control	Post control severity	Post control probability	Assessed risk after control
Location and availability of emergency personnel including surface support has not been considered.	5	4	20	<ul style="list-style-type: none"> <li>Surface support to monitor divers and respond in the event of an emergency.</li> <li>Written emergency plans.</li> <li>Documented roles in an emergency.</li> <li>Regular testing of the emergency plans.</li> <li>All crew trained in first aid and oxygen administration.</li> </ul>	5	1	5
Location and availability of emergency equipment has not been considered.	5	4	20	<ul style="list-style-type: none"> <li>Emergency oxygen and defibrillator checked pre departure.</li> <li>Rescue equipment available to assist – spinal board and life ring/rescue tube.</li> <li>First aid kit checked and up to date.</li> </ul>	5	1	5
Inadequate emergency response procedures (including communications)	5	4	20	<ul style="list-style-type: none"> <li>Testing of the emergency plan on a regular basis and whenever starting a new site to ensure an effective and efficient emergency plan.</li> </ul>	5	1	5

				<ul style="list-style-type: none"> <li>• Check communications to shore is working.</li> </ul>			
No surface support, standby diver or buddy.	3	4	12	<ul style="list-style-type: none"> <li>• Surface support for all dives in place.</li> <li>• Standby diver dressed and ready to enter the water.</li> <li>• If using a buddy as standby diver, separation distance minimised to ensure joint supervision.</li> </ul>	3	2	8
No alternate air supplies	5	4	20	<ul style="list-style-type: none"> <li>• All divers to carry a bail out bottle.</li> <li>• Reserve air available from the surface.</li> <li>• Consider deco bottles if diving deep.</li> </ul>	5	1	5

**Significant changes – work must stop immediately if there is a significant change in the method or type of work to be done or in the environmental conditions.**

Example

Worker name	I acknowledge that I have read this record Signature:	Date

Example only

## Risk control

The hierarchy of control measures in s. 36 of the Work Health and Safety Regulation 2011 (and referenced in AS/NZS 2299.1:2015, appendix D4.2) must be taken into account:

### 1 General

Control of risk is achieved by selecting from the hierarchy of control measures, one or more measures which individually or in combination achieve the required risk reduction.

### 2 Control measures

Appropriate control measures should be applied to risks, using the hierarchy of controls in the following order:

- Elimination – where the level of risk cannot be controlled to an acceptable level, no diving should take place.
- Substitution – where the risk can be controlled by performing the task by using alternative methods of diving, consideration should be given to using these alternative methods.
- Design – plant and procedures should be designed to minimise risk.
- Isolation – people should be isolated from the identified hazards.
- Administrative – every dive plan should minimise the degree and duration of the divers' exposure to risk. Administrative controls include:
  - training, supervision, experience and selection of employees, including staffing levels
  - provision of an appropriate diving operations manual
  - organisation and planning before, during and after the dive
  - selection of appropriate plant
  - selection of the appropriate form and level of communication.
- Personal protective equipment (PPE) – appropriately designed and sized PPE should be provided, used and maintained. The limitations of all equipment should be identified as part of the risk assessment process. Information from manufacturers and from records of prior experience should be used to identify limitations.



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