



Australian Government

Department of Education, Employment and Workplace Relations

SFIAQUA508C Plan and design stock culture or holding systems and structures

Release: 1

SFIAQUA508C Plan and design stock culture or holding systems and structures

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency involves designing stock culture or holding structures and systems for aquacultural enterprises and facilities. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.
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Application of the Unit

Application of the unit	This unit has application to stock culture and holding structures and systems. They may be manually operated systems and monitoring, or fully automated systems with computer control and monitoring. Standards of uniformity and efficiency may vary from system to system. All enterprise or workplace procedures and activities are carried out according to relevant government regulations, licensing and other compliance requirements, including occupational health and safety (OHS) guidelines and ecologically sustainable development (ESD) principles. Equipment operation, maintenance, repairs and calibrations are undertaken in a safe manner that conforms to manufacturer instructions. Appropriate personal protective equipment (PPE) is selected, checked, used and maintained.
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Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine appropriate location or orientation	1.1. Type of culture or holding structure or system is determined to ensure appropriate environment is provided for cultured or held stock. 1.2. Numbers of structures are determined to ensure stock is available in sufficient quantity at harvest. 1.3. Water use and culture or holding structure or system are designed, located or orientated to make the best use of water resources. 1.4. Mechanisation or automation of process or activity, including the use of specialised contract services, is researched and introduced. 1.5. Design calculations and decisions are documented and construction specifications define the work required to make suitable culture or holding structures available. 1.6. Environmentally sensitive areas are identified and protected according to local, state, territory and national legislation and land degradation issues identified.
2. Design culture or holding structures and systems	2.1. Individual culture or holding structures are designed to provide optimal conditions for the cultured or held stock and to be combined into reliable, functional, serviceable and flexible systems for the intended operations. 2.2. All production inputs and culture or holding activities are considered in the design of the systems. 2.3. Construction materials are selected to suit the design specifications and design calculations and decisions are documented. 2.4. Relationship between capital and operational costs is optimised, including a comparison of energy sources. 2.5. Power supply design specifications are checked with power authorities. 2.6. Structures, valves, accessories and performance indicators are selected and integrated into functional systems that can be monitored and maintained. 2.7. Construction specifications define work required to achieve the required standards of uniformity and efficiency of culture or holding operations according to industry standards.
3. Determine capital expense budget	3.1. Design calculations and decisions are documented and relevant information is communicated clearly through plans, specifications and manuals.

ELEMENT	PERFORMANCE CRITERIA
	3.2. Design output is checked by a competent designer against enterprise objectives. 3.3. Materials requirements are determined and documented from plans and specifications. 3.4. Labour requirements are estimated, based upon documented work schedule with reasonable allowance for variances in work schedules. 3.5. External labour and hire equipment contracts are negotiated and confirmed with management. 3.6. Costing attributed to each component is based upon quoted information from suppliers or sound analysis of individual elements.

ELEMENT	PERFORMANCE CRITERIA
4. Determine operating expense budget	4.1. Operating expense budget confirms all expenses are applied to the completed stock culture or holding system.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- applying analytical processes to identify labour and cost savings, and improved efficiencies
- communicating with contractors, suppliers and management
- defining culture systems
- designing a culture or holding structure and integrating that into a culture or holding system
- determining capital expense budget and operating expense budget
- determining design requirements
- negotiating contracts for labour and equipment hire
- organising costing, labour, contractors, suppliers, materials and equipment
- researching mechanical and automation options.

Literacy skills used for:

- documenting design and specifications
- interpreting technical literature and design specifications
- maintaining records
- reading equipment operator manuals
- writing reports.

Numeracy skills used for:

- applying formulae to determine flows, pump efficiency, dissolved oxygen and water requirements, and volume and surface area
- budgeting and reviewing costings
- comparing energy sources.

Required knowledge

- automatic control and monitoring systems

REQUIRED SKILLS AND KNOWLEDGE

- biological requirements of cultured of held stock
- budgeting, waste management and environmental issues
- contract development and management
- design processes
- government regulations
- latest culture technology
- mechanisation or automation of process or activity
- use of specialised contract services.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment evidence required to demonstrate competence in this unit

Assessment must confirm the ability to:

- design basic systems
- assess impact of designed system on:
 - cost reduction and efficiency
 - labour
 - OHS
 - stock.

Assessment must confirm knowledge of:

- aquaculture engineering
- aquatic organism physiology
- functions of stock culture or holding structure components
- stock, biological and production cycles.

Context of and specific resources for assessment

Assessment is to be conducted at the workplace or in a simulated work environment. It should involve planning and designing one or more culture structures typically used in the region.

Resources may include:

- farm or hatchery components.

Method of assessment

The following assessment methods are suggested:

- case studies
- demonstration
- practical exercises
- project (work or scenario based)
- written or oral short-answer questions.

Guidance information for assessment

This unit may be assessed holistically with other units within a qualification.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Relevant government regulations, licensing and other compliance requirements may include:

- business or workplace operations, policies and practices:
 - commercial law, including fair trading and trade practices
 - consumer law
 - corporate law, including registration, licensing and financial reporting
 - disability policies and practices
 - equal opportunity, anti-discrimination and sexual harassment
 - industrial relations and awards, individual employment contracts and share of catch agreements
 - jurisdictional variations
 - superannuation
 - taxation
 - trade practices
 - warnings and dismissals
 - worker's compensation
- ESD principles, environmental hazard identification, risk assessment and control
- fisheries or aquaculture regulations, permits, licences, quotas, catch restrictions and other compliance requirements, including:
 - Australian Exclusive Economic Zone
 - international treaties and agreements
- food safety, Hazard Analysis Critical Control Point (HACCP), hygiene and temperature control along chain of custody
- imports quarantine and inspection, and importing approved arrangements for Australian Quarantine Inspection Service (AQIS), Australian Customs Service (ACS) and Biosecurity Australia (BA)

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- Indigenous native title, land claims and cultural activities, including fishing by traditional methods
- maritime and occupational diving operations:
 - foreign and Australian legislation applying to quarantine and customs
 - International Convention for the Safety of Life at Sea (SOLAS)
 - International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW 1978)
 - Marine Emergency Response Search and Rescue (MERSAR)
 - National Standards for Commercial Vessels
 - pollution prevention - International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)
 - Uniform Shipping Laws (USL) Code
 - use of vessels, right of way and other marine orders, bunkering and refuelling
- land, buildings and vehicles:
 - buildings and structures design and appearance, constructions and additions
 - poaching, trespass and theft
 - road laws for use of motor vehicles, bikes, trucks and other transport equipment
 - soil and water management
 - use of chemicals and biological agents
 - use of firearms and powerheads
 - use of utilities, including water, natural gas, electricity and sewage
 - water or land lease, tenure or ownership and use
- OHS hazard identification, risk assessment and control
- product quality assurance:
 - correct naming and labelling (e.g. country of origin, Australian Fish Names Standard and eco-labelling)
 - correct quantities, sizes and other customer requirements

RANGE STATEMENT	
	third-party certification (e.g. Australian Grown and ISO 14001:2004 Environmental management systems).

RANGE STATEMENT	
<i>OHS guidelines</i> may include:	• appropriate workplace provision of first aid kits and fire extinguishers • clean, uncluttered, hygienic workplace • codes of practice, regulations and/or guidance notes which may apply in a jurisdiction or industry sector • enterprise-specific OHS procedures, policies or standards • hazard and risk assessment of workplace, maintenance activities and control measures • induction or training of staff, contractors and visitors in relevant OHS procedures and/or requirements to allow them to carry out their duties in a safe manner • OHS training register • safe lifting, carrying and handling techniques, including manual handling, and the handling and storage of hazardous substances • safe systems and procedures for outdoor work, including protection from solar radiation, fall protection, confined space entry and the protection of people in the workplace • systems and procedures for the safe maintenance of property, machinery and equipment, including hydraulics and exposed moving parts • the appropriate use, maintenance and storage of PPE.
<i>ESD principles</i> may include:	• controlling use and recycling of water, and managing water quality and quantity • increasing use of renewable, recyclable and recoverable resources • managing environmental hazard identification, risk assessment and control • managing imported products quarantine and inspection, facility biosecurity, translocation of livestock and genetic material, and health certification • managing stock health and welfare, especially for handling, holding, transport and slaughter • managing sustainable fisheries or broodstock/seedstock collection requirements, such as size limits, quotas, season restrictions,

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	population dynamics, fishing impacts, reducing by-catch, fisheries management strategies and maintaining biodiversity • managing, controlling and treating effluents, chemical residues, contaminants, wastes and pollution • minimising noise, dust, light or odour emissions • planning environmental and resource efficiency improvements • preventing genetically modified and live cultured or held organisms from escaping into environment • protecting native and protected flora and fauna, marine or land parks or areas, adhering to the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), the Ramsar Convention, World Heritage and other international treaties for which Australia is a signatory • reducing emissions of greenhouse gases • reducing use of non-renewable resources • reducing disturbances to soils, erosion and surface water flows from machinery use and other activities • reducing energy use and introducing alternative energy sources.
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RANGE STATEMENT	
<i>PPE</i> may include:	• buoyancy vest or personal floatation device (PFD) • gloves, mitts or gauntlets, and protective hand and arm covering • hard hat or protective head covering • hearing protection (e.g. ear plugs and ear muffs) • insulated protective clothing for freezers or chillers and refrigeration units • non-slip and waterproof boots (gumboots) or other safety footwear • personal locator beacon or Emergency Position Indicating Radio Beacon (EPIRB) • protective eyewear, glasses and face mask • protective hair, beard and boot covers • protective outdoor clothing for tropical conditions • respirator or face mask • safety harness • sun protection (e.g. sun hat, sunscreen and sunglasses) • uniforms, overalls or protective clothing (e.g. mesh and waterproof aprons) • waterproof clothing (e.g. wet weather gear and waders).
<i>Culture or holding structure or system</i> may include:	• blowers, aerators, paddlewheels and aspirators • cages, pontoons, enclosures and pens, including associated moorings, anchors, floats and markers • dams, ponds and pools • display tanks, aquaria and aquascapes • greenhouses, hothouses and igloos • grow out facilities, hatcheries and nurseries • harvesting swimways, canals or channels • live holding tanks, bins, cages and pens • longlines, posts, racks and rails, rafts, fences, socks, trays, sticks, baskets, modules, barrels, bags and panels • open, flow-through, closed and semi-closed systems • pest, predator and disease control structures • purging or depurating systems

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- tanks, raceways and recirculating systems
- water supply and disposal or effluent systems, including pumps, pipes, canals, channels, settlement ponds and storage dams.

RANGE STATEMENT	
<i>Production inputs and culture or holding activities</i> may include:	• chemicals and treatments • food and nutriment • handling • harvesting • pest, predator and disease control • post-harvest • stocking • transport • water supply and disposal.
<i>Construction materials</i> may include:	• brick • concrete • earth • fibreglass • glass • nylon • PVC, polyethylene and other plastics • stainless steel and treated metals • wood.
(Design) <i>decisions</i> may be influenced by:	• budget • environmental constraints • owner preferences • product availability • quoting procedures.

Unit Sector(s)

Unit sector	Aquaculture operations
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Co-requisite units

Co-requisite units		

Competency field

Competency field	
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