



Dock Pontoon and Link Spans

From HSE - SIM 05/2001/55 Linkspans and Walkways, Ship-to-Shore Access

1 Design & Installation

1.1 Design

Type, shape, size etc

What type of linkspan is proposed (pedestrian/vehicle/both, fully suspended, fully buoyant, floating/semi-submerged pontoon etc)?

Is a single service installation proposed, or should consideration be given to future use by larger ships, lorries, or further development?

What is the intended design life of the structure?

Which standards are to be adopted?

What vehicle clearances, height, width, length, turning circle, approach departure angles and ramp over-clearances are required?

Have gross vehicle weight, vehicle queue length, number of vehicles, speeds and frequency of vehicles, passenger queue length etc been considered?

What tidal range, sill/deck height define the operating envelope?

What are the arrangements at the ramp end; ie ship ramp on top, or linkspan on ship deck, the location and operation of finger flaps, if any, and are they load bearing?

What are the vessel mooring plans (ship moored to ramp only, moored to ramp and adjacent quay or dolphins, or moored to adjacent quay or dolphins without attachment to ramp)?

Will any ramp-end finger flaps, hinges, pivots and associated hydraulics be subjected to excessive loading by ship or pontoon movement?

Can the bankseat (inland end) and vulnerable parts of the structure absorb ship impacts and other forces from all possible angles and directions?

Does the design methodology include a failure modes assessment to identify safety critical single load path components and does it consider the limits of movement together with what happens when they are reached or exceeded?

Has consideration been given to secondary support, i.e. safety chains, trapped mountings of some sort, or redundancy in design?

The above imply 6 degrees of movement, (linear in 3 planes and rotational about 3 axes) which will require articulation. Pivots hinges,



supports and connections need to be purpose designed and should be protected against the ingress of salt, sand or other damaging materials and capable of being properly lubricated.

People

Is the route accessible by people with

- mobility impairment?
- wheelchairs or mobility scooters?
- Visual impairments?
- Hearing impairments?

Have risks and preventative measures been taken for children, people with learning difficulties or cognitive impairments?

On long routes are there secure rest points every 20-30 metres.?

Is there shelter available for people waiting to board?

Is the route lighted 150 Lux along routes and 200 Lux where there are steps or joins?

Are there sufficient handrails on all inclines and steps?

Are there guardrails along all sections of the route at least 1100 mm high?

Are tapping rails fitted on all guardrails?

Has lift or crane access been assessed and provided where feasible? (see our guide Accessible Boarding)

Local environmental and operational considerations

What are the local water conditions; wave height, current speeds and direction surges due to other vessel movements?

Have extreme tidal movements and astronomical plus worst weather effects been allowed for?

What are the worst combination loading from wind, wave and current that the structure will experience?

What pontoon location method is to be used?

Does the pontoon have sufficient size and buoyancy to be stable under the movement of the heaviest vehicle combinations?

What are the bedrock conditions?

What are the effects of silting or scour likely to be?

What happens when the extremes of ship movement, (ranging, drifting, rolling and pitching) are reached?

Are safety margins adequate?

Are there prior warnings (e.g. human operator or automatic position monitoring) and a methods of disconnection at extremes?



What method of height adjustment is to be provided, automatic/manual?

Is the machinery vulnerable to flooding?

What happens in the event of power failure?

Have corrosion risks been fully considered?

Have maintenance requirements, including safe access, been considered and provided for?

Will a design package including concept drawings, design drawings and all necessary calculations be provided?

1.2 Fabrication

Which standards (BSI, EN, Industry etc) have been adopted?

Who is going to verify compliance?

Where is the fabrication to be carried out? On site? In another country?

Is it a one piece construction or an assemblage of large sub-assemblies?

Will a package including fabrication drawings, materials certificates, NDT certificates be provided?

1.3 Installation

Is the sequence of installation critical?

Does the sequence of assembly/construction avoid the imposition of excessive loads or stresses on or in any components or sub-assemblies?

Has any lifting equipment incorporated in the structure been tested/examined/ certified?

Are safety critical items; bearings, rams, chains, etc identifiable and traceable through the supply chain?

Have the maximum wind, tidal and other potential forces and loads on the partially assembled structure been calculated and allowed for?

Is there a specified commissioning procedure?

Has the buoyancy/stability of the incomplete structure been confirmed?

1.4 Maintenance

Was a maintenance programme part of the design specification?

Have all parts of the structure requiring inspection/maintenance been identified and listed?



Is routine examination of safety critical components including structural elements and supports and connections planned?

Does it include examination of stress points, welds, corrosion protection etc as well as lubrication, replacement and testing of wear/moving and load bearing components?

Are there any safety or reliability critical components that require replacement at set intervals?

Have wear limits been set?

Is safe access to all to all parts of the installation readily available for examination, lubrication etc?

Can maintenance work, component replacement etc be carried out without the need for

Major dismantling or reconstruction?

Do the necessarily removable components have built in lifting eyes, lugs, lifting attachments?

Is the maintenance programme being carried out?

1.5 Use

Is there a programme of pre-use trials?

Is there an operating manual?

Have operating staff been adequately trained and properly appointed?

Are there formal systems of co-operation between dockside operations staff and vessels crew in respect of:

- Mooring,
- Linkspan connection/disconnection procedures (both routine and in emergencies),
- Adequate communication for passenger/crowd control (both routine and in emergencies)?
- Interaction with people with disabilities and any equipment or procedures adopted to aid these people?
- Rescue of people in the water?

Are there contingency plans to enable the passengers and cargo to be unloaded safely if the dedicated berth is unavailable or the vessel unable to use it for any reason?

Are any flying lead controls sufficiently robust, e.g. waterproof?

Are the operating conditions fully understood by the users with respect to:

- Operating envelope
- Ship dimensions

- Weather windows
- Action if conditions exceeded?

Is there a defect reporting and action system in operation?

Is there a formal incident reporting and recording system?

2 Consents

Table 1: Recreational boating sector activities and their required consents
(Adapted from the Solent Forum, Marine Consents Guide 2002)

Activities requiring consent	Planning Permission	FEPA Licence	Land Drainage	Coast Protection Consent	Harbour Authority Act Consent	Waste Licensing Consent	Discharge consent
Construction/ alteration of slipways, jetties, marinas, pontoons	•	•	•	•	•		
Laying moorings		•	•	•	•		
Navigation marks and lights					• ¹		
Capital dredging	• ²	•	•	•	•		
Maintenance dredging	• ²	•	•	•	•		
Disposal of dredge spoil into the sea		•		•			
Disposal of dredge spoil onto land					•	•	
Coastal protection works	•	•	•	•	•		
Flood defence	•	•	•	•	•		
Foreshore recharge/ Beneficial use of dredging	•	•	•	•	•	•	
Land claim from the sea	•	•	•	•	•		•
Effluent Discharge (sewage, industrial, contaminated site drainage)							•
House-boats	•				•		

¹ Consultation required with Trinity House
² Capital and maintenance dredging may be permitted planning development if undertaken by a Statutory Undertaker or their lessee

2.1 Environment Tourism and leisure - Marinas

EIA - Environmental Impact Assessment

Where the area of the enclosed water surface exceeds 1,000 square metres

In assessing whether significant effects are likely, particular regard should be had to any wider impacts on natural coastal processes outside the site, as well as the potential noise and traffic generation. EIA is more likely to be required for large new marinas, for example where the proposal is for more than 300 berths (seawater site) or



100 berths (freshwater site). EIA is unlikely to be required where the development is located solely within an existing dock or basin.

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