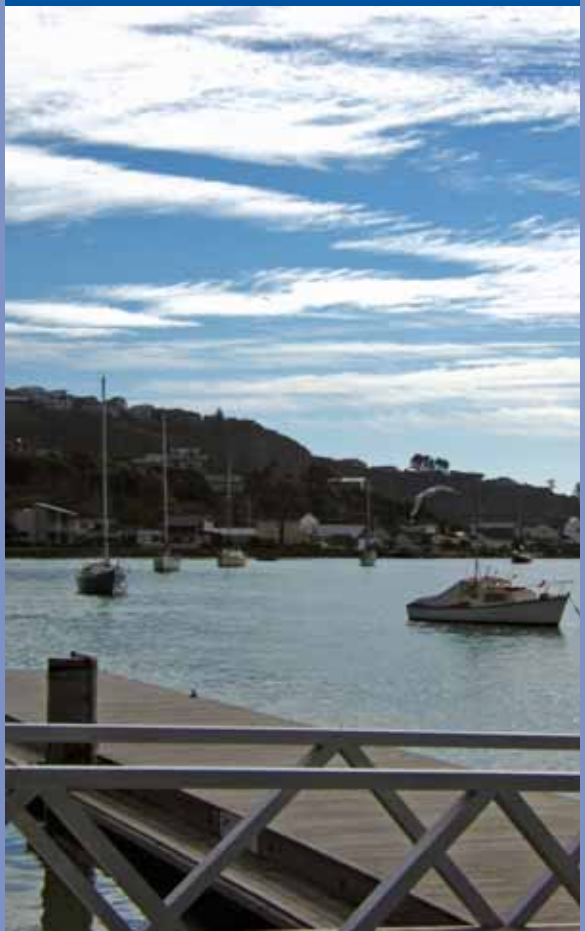
Swing Moorings

Information on construction and maintenance



Environment Canterbury
Your regional council

Contents

Swing Moorings

Swing moorings

Environment Canterbury (ECan) has responsibilities under the Resource Management Act and the Local Government Act for the control of aspects of swing moorings. This booklet has been prepared to assist swing mooring owners to identify appropriate construction and maintenance specifications.

ECan has prepared this booklet after taking advice from an appropriately qualified and experienced technical expert. All reasonable care has been taken to ensure that the information is accurate.

Swing mooring design

The updated specifications are outlined in Table 1 (page 2). There have been some changes compared to earlier guidelines. For smaller vessels (less than 6m in length overall) the minimum mooring block size is now 1000kg (previously 1200kg) and for larger vessels (up to 12m) the mooring block size has been increased to 2000kg (previously 1800kg), refer to figures 4 & 5 for details. These mooring blocks are heavier than some currently in use.

Any movement of a mooring block results from a combination of:

- uplift and horizontal forces (ground chain becoming taut), or
- liquefaction of ground conditions (wave action), or
- loss of suction (a combination of wave action and chain tension).

Table 1 - Mooring Specifications - See Figure 1

Vessel		Mooring				
		A	B	C		D
Displacement of vessel (tonnes)	Vessel length overalll (metres)	Mooring block air weight (tonnes[1])	Shackle	Ground chain		Shackle or ring
			Min bar size diameter (mm)	L	Diameter (mm)	Diameter (mm)
Less than 3	Less than 6	1	32	6m	20	16
3-20	6-12	2	32	= length of vessel 6-12 metre	32	19
Over 20	Greater than 12	- Subject to specific engineering assessment[2] -				
		E	F	G		H
Displacement of vessel (tonnes)	Vessel length overalll (metres)	Intermediate chain		Swivel	Top chain or rope		Buoy rope
		L	Diameter (mm)	Diameter (mm)	L	Diameter (mm)	
Less than 3	Less than 6	1.5 x depth at high water	12	20	To suit vessel min 2.5m	12mm chain or rope of equivalent strength	15mm synthetic rope
3-20	6-12		16	25			
Over 20	Greater than 12	- Subject to specific engineering assessment[2] -					

Notes:

[1] Mooring blocks to be embedded in the seabed to ensure that the full passive earth pressure resistance is developed.

[2] Minimum factor of safety against quasi-static mooring force for the mooring block is 3.

[3] Overall chain length = G + E + C (Ground chain + Intermediate chain + Top chain.)

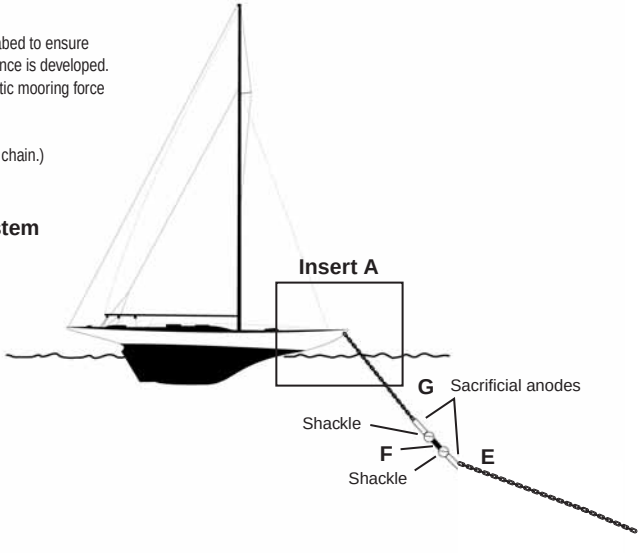


Figure 1 - Mooring System

Mooring Specifications

The design of the mooring block, increased length or weight of ground chain, embedding the mooring block into the seabed, plus the optional use of a nylon spring in the mooring system (see Figures 2 & 3) in water depths greater than two metres at chart datum, and on vessels greater than six metres in length overall, will all make the mooring more effective. However, care must clearly be taken before lengthening the ground chain for an existing swing mooring. If you want to lengthen the ground chain of an existing swing mooring, please contact the Regional Harbourmaster at ECan.

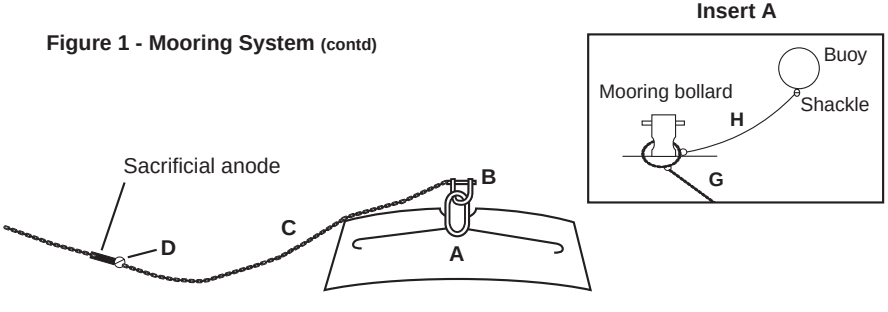
The seabeds in Canterbury harbours are principally marine silts, but in some areas mixed sand is common. In both these conditions it is important that the mooring block is built according to minimum specifications (see Figures 4 & 5) to maximise holding power.

To get the best result, the block needs to expel air and liquid as it enters the seabed. To ensure the block is secure, the block may need to be jetted or 'airlifted' in. Liquid silts will soon fill the space adjacent to its sloping sides, effectively keying the block into the seabed. This situation increases holding, and decreases the block profile, reducing the prospect of the mooring block being hit by the keels of other boats, or of it being snagged.

The sloping sides of the block will:

- Help embed the mooring into the seabed,
- Reduce the chance of snagging, and
- Assist the block to rotate in conditions where the ground chain tension is very high. This will cause the block to dig in (like the flukes of an anchor) and increase its sectional area in the direction of the load.

Figure 1 - Mooring System **(contd)**



A depression in the centre of the block will also stop snagging occurring, and should reduce wear on the ring and principal shackle by restricting movement.

In exposed coastal environments such as Kaikoura, specific advice should be sought from an engineering consultant on a complete mooring sysytem.

Mooring tackle is designed to withstand the effects of corrosion and wear. Corrosion effects can be significantly reduced by providing zinc sacrificial anodes to the chains as shown on the drawings on page two.

Swing mooring maintenance and inspection

The safety of a mooring is the responsibility of its owner. The whole system must be inspected at least annually, to remove kinks and replace worn (those showing more than 10% wear) components. All shackles in the mooring system should have the shackle pin moused with stainless steel or copper wire. Alternatively the shackle body and pin can be drilled and a stainless steel split pin inserted.

When a vessel is riding on a mooring, a ‘safety pin’ or clamp should be used to prevent the mooring chain or rope jumping out of the bow fairlead. Regular checks should be made around the bow fairlead as chafing and wear regularly show up in this area.

Siting of swing moorings

In assessing a resource consent application for a swing mooring, ECan considers the effects of the mooring on the environment, including effects on navigation and safety. The consent applicant needs to ensure that the site for the swing mooring is suitable.

Once the block has been laid, ECan:

- Will monitor moorings to ensure that they comply with all Navigation Safety Bylaws and Resource Management Act requirements.
- May investigate any mooring site that has been left vacant for an extended period, when no inspection report has been filed and/or no current address for the mooring owner is available.
- Is not responsible for the security of any mooring.
- Is not responsible for any damage or loss that may occur that is related to the Mooring System.

Transfer of ownership

If you want to sell a swing mooring, please use the Transfer of Ownership Swing Mooring form available from ECan on our website www.ecan.govt.nz/navsafety.

This form is to be completed by the previous and new owners, and returned to ECan.

The following requirements must be met:

(1) the mooring must have been satisfactorily inspected within the 12 months and ECan advised of the inspection,
(2) the buoy must be correctly numbered, and
(3) the transfer fee must be paid (fee to be paid by the seller).

Fees and charges

If an owner does not undertake an annual inspection of their mooring site as required in their consent,

or is otherwise non-compliant, they may incur charges for inspection or removal of the mooring system by ECan.

All swing moorings authorised by resource consent issued after 1 October 1991 may incur standard charges for compliance monitoring. The Council operates a policy of requiring consent holders to pay for all actual and reasonable charges resulting from compliance monitoring. The charges will vary depending on the level of monitoring needed. These costs can be minimised by complying with the conditions of your resource consent. You can minimise charges by:

a) ensuring you undertake the required annual inspection and supply all the information you are required to as part of the resource consent without needing to be reminded,
b) providing assistance to the monitoring officer if and when you are contacted or visited.

Mooring buoy

The mooring buoy must be a specific bright colour and if hollow must be filled with polystyrene beads or foam. The swing mooring number must be engraved on top in lettering not less than 30mm high and painted in a contrasting colour.

Colour Code:

Yellow buoy	For vessels up to 6m (1000kg block)
Orange buoy	For vessels 6 to 12m (2000kg block)
Blue buoy	For vessels over 12sm

Address update

Swing mooring owners should notify ECan of any change of address. Information on applying for resource consents for swing moorings can be obtained from:

Customer Services Environment Canterbury
PO Box 345 Christchurch
Tel: (03) 353 9007, 0800 EC INFO (0800) 324 636,
or Fax (03) 365 3194

Figure 2 - Mooring line arrangement for swing mooring
incorporation of nylon spring to mooring line

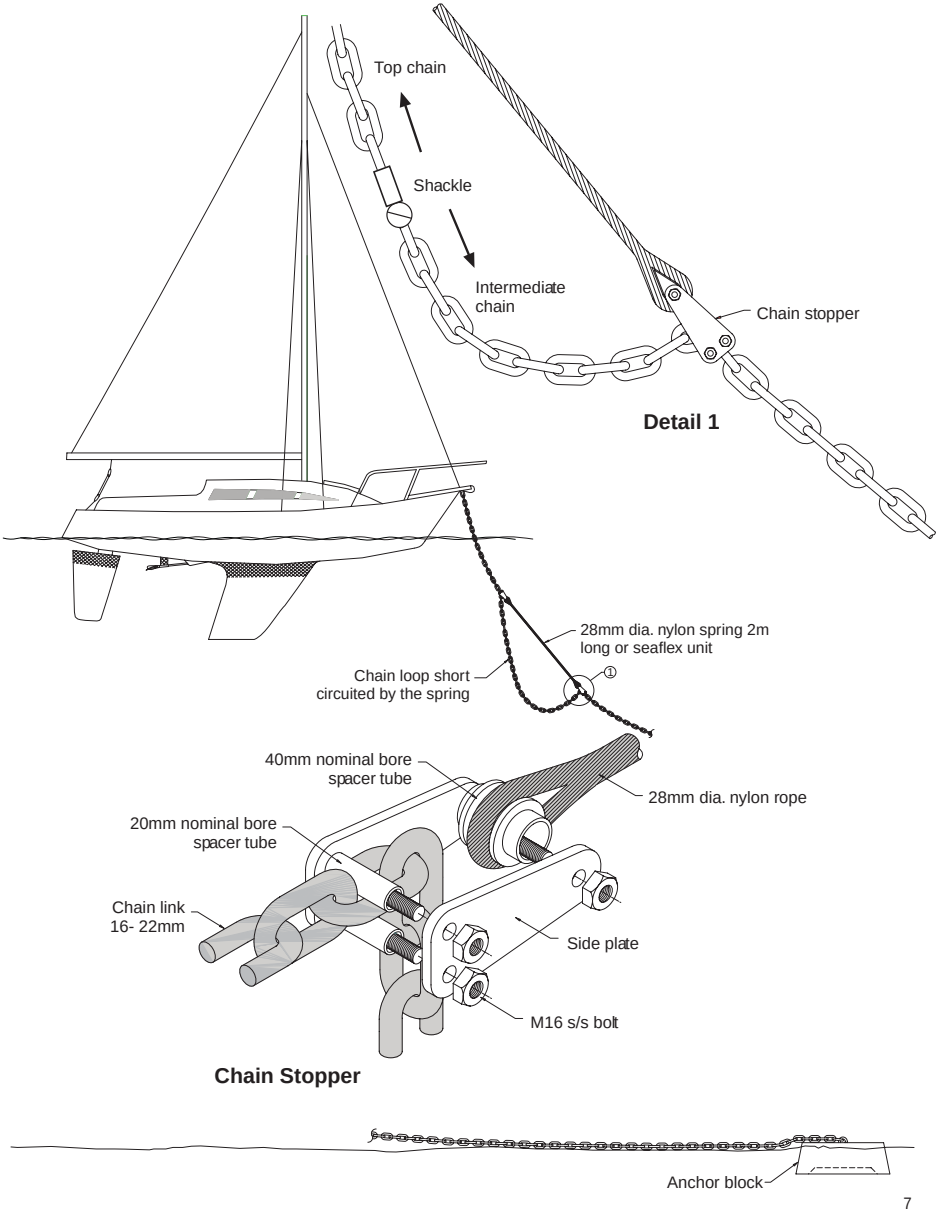
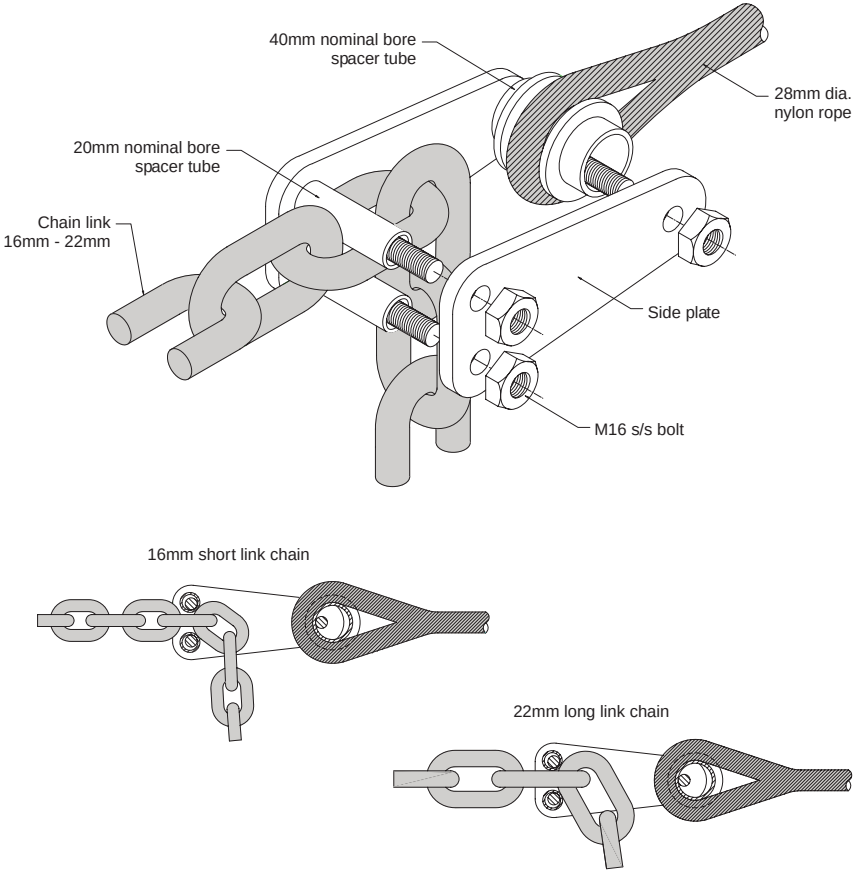


Figure 3 - Mooring line chain stopper for 16-22mm links general details

Isometric View Of Chain Stopper

Note: for use in depths over two metres at chart datum and vessels over 6 metres in length overall.



Note: Contact ECan for detailed specifications for chain stoppers.

Figure 4 - Standard 1 tonne mooring block

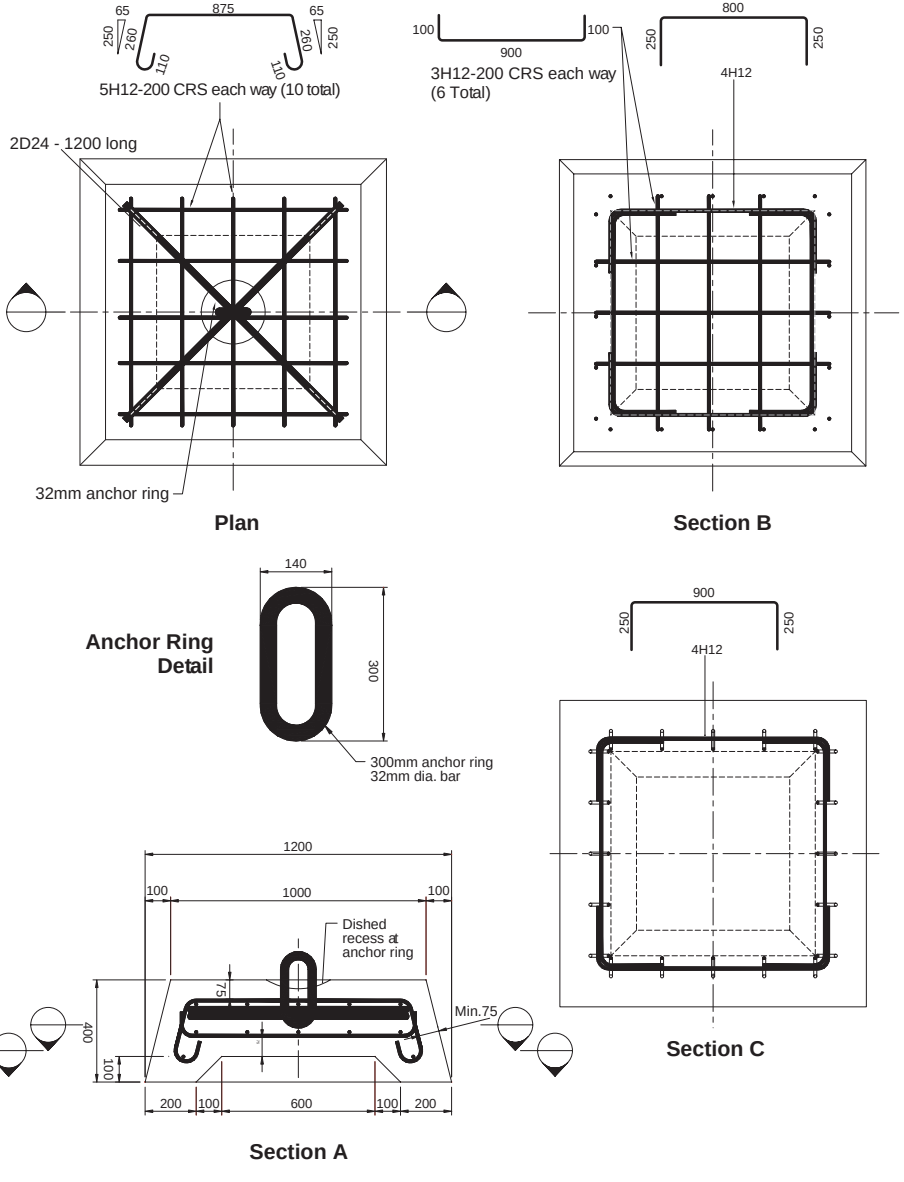
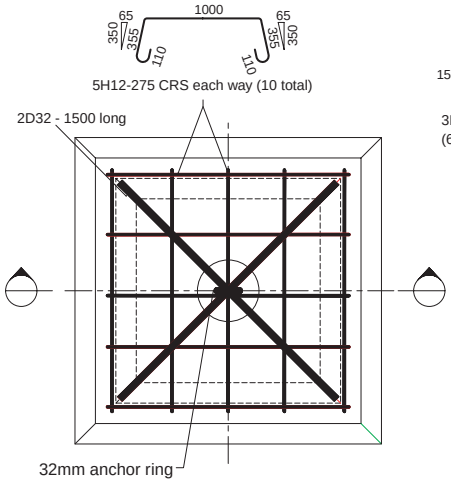
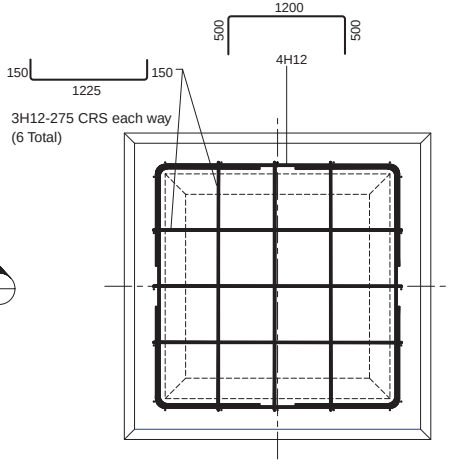


Figure 5 - Standard 2 tonne mooring block

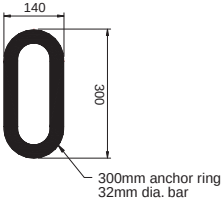


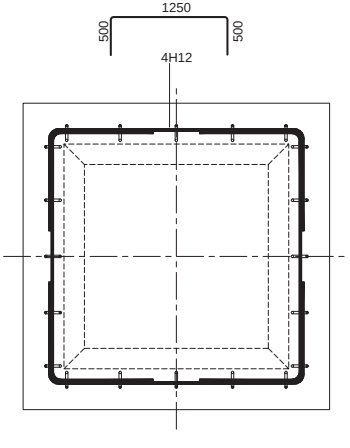
Plan



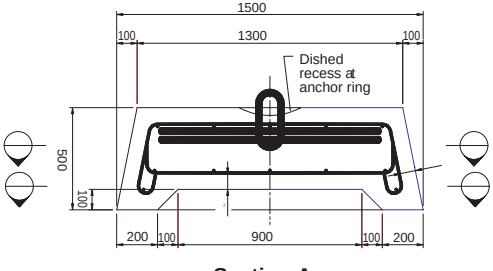
Section B

Anchor Ring Detail





Section C



Section A

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Skipper Responsibility

I'm a responsible Skipper who will ensure:

- I have the necessary skill, knowledge and qualifications to safegaurd all on board.
- My vessel and all its equipment are properly maintained:
- My vessel carries all the necessary safety equipment.
- We have a minimum of two means of communication: i.e VHF marine radio, cellphone, flares.
- Each passenger has a correctly fitted buoyancy aid.
- My passengers are briefed on the location and use of all safety equipment.
- The weather conditions and outlook are suitable for the trip planned.
- I always comply with the Maritime 'rules of the road'.
- My vessel is loaded within its limits and all equipment is securely stowed.
- Someone ashore knows where we are going and when we'll be back.

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Tips about Boating Safety

1. Check the boat, engine, and equipment before leaving.
2. Check the weather forecast and tides before leaving.
3. Tell someone where you're going, and when you'll be returning.
4. Know the: Collision Prevention Rules, Water Recreation Rules and local bylaws.
5. Never overload the boat.
6. Take a proper lifejacket for each person on board; wear them.
7. Have aboard: Anchor, bailer, spare fuel, torch and warm gear.
8. Guard against fire.
9. Avoid alcohol when boating.
10. Take two means of communication: VHF, Flares, EPIRB, cellphone in a plastic bag.

58 Kilmore Street, P O Box 345, Christchurch.
Telephone (03) 353 9007, 0800 ECINFO 0800 324 636
www.ecan.govt.nz

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