

3 Regional FAD design modifications

3.1 French Polynesian FAD

Over the past three decades, French Polynesia has deployed hundreds of spar and Indian-ocean type anchored FADs. During this time, numerous FAD design and deployment modifications have been tested. The development of the small barge for safe deployment of heavy anchors (see 5.3 Small barge deployments) is an innovation originating in French Polynesia that has gained traction across the region in the past few years. The main design modifications made to the Indian-ocean FAD (Figure 10) are listed below.

- Surface floatation changed to 10B/12B pressure floats (with centre hole and 600 m pressure rating) as it was found that at some sites the 30G buoys imploded when they plunged to deep depths during periods of high current.
- 24 mm braided nylon rope used through the surface buoys, negating the need for a plastic hose sheath.
- Buffers between surface floats changed from purse-seine buoy to polypropylene rope twisted into the braided nylon rope on either side of the 10B/12B pressure floats.
- Fishing techniques used in some areas of French Polynesia, e.g. drop stone and vertical longlining, resulted in entanglement of fishing line, which cut through the nylon rope used in the upper part of the mainline. At locations where such fishing techniques are common, the nylon rope is replaced with 16 mm twisted polypropylene/cable. As the twisted combined polypropylene/cable rope cannot be spliced, this rope also required the use of 18 mm galvanised thimble loops, held in place with 16 mm wire grips at the top and bottom rope joins.
- Anchors used at some deployment locations have been modified to smaller (50 kg) cement blocks connected by a galvanised chain. Multiple small blocks can enable deployments from small boats (see 4.3.1 Anchor types).

Design and deployment notes

- Polypropylene/cable rope is not readily available across PICTs and requires the use of thimble loops.
- Polypropylene/cable rope is heavy and makes deployments difficult – a maximum length of 300 m is recommended.
- The calculation of lengths of polypropylene/cable rope and polypropylene rope, required to ensure that an appropriate catenary curve is created, requires a skilled technician. (Note: the mooring length calculation tables provided in section 4.2.3 of this manual do not include polypropylene/cable ropes.)

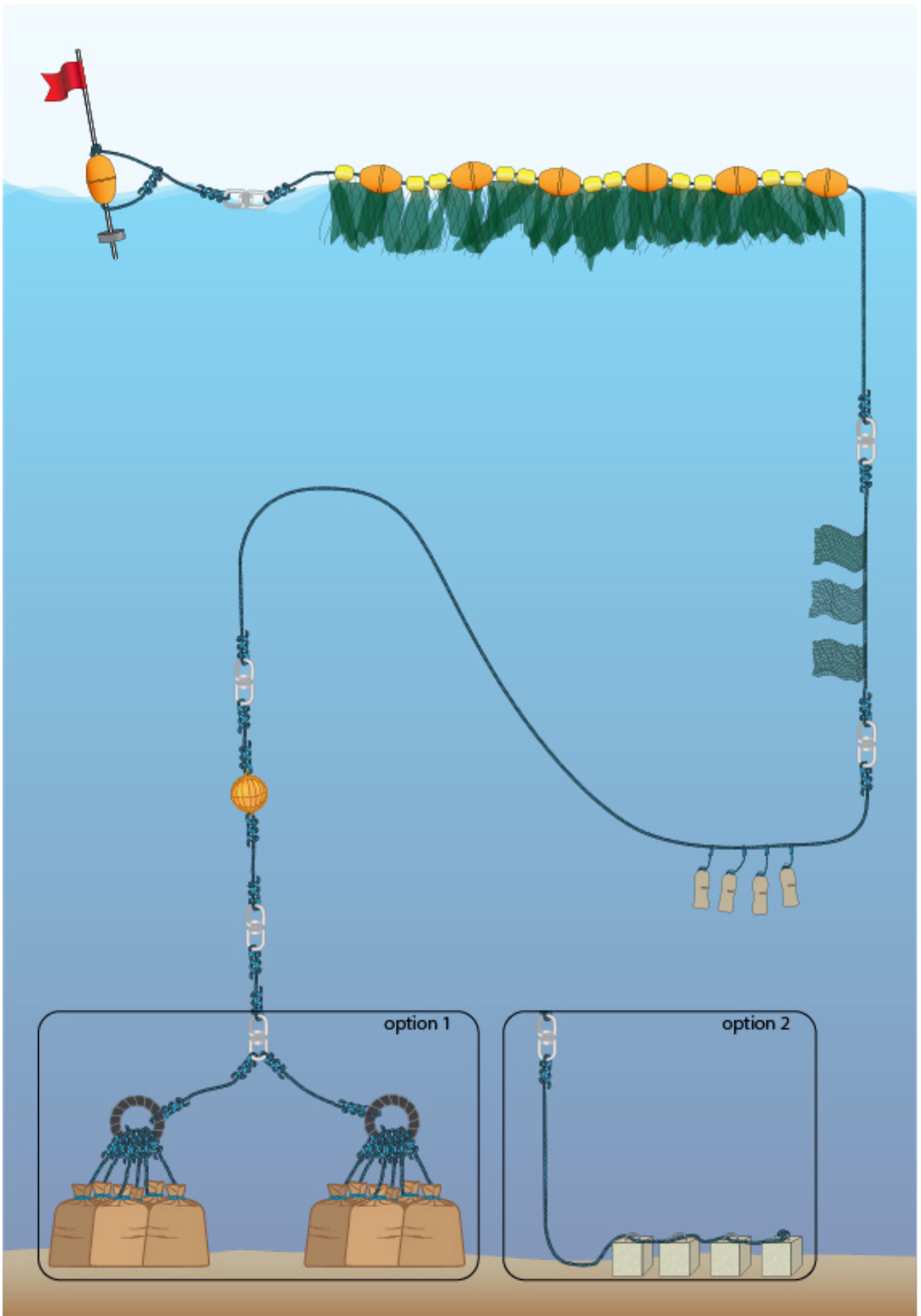


Figure 11. Vatuika FAD design modification.

3.2 Vatuika FAD

Anchored FADs were first introduced to Vanuatu by SPC in 1980, mostly using the spar buoy type FAD and then the Indian Ocean design primarily for commercial and charter fishing. From 2010, several other designs were introduced to Vanuatu that were targeted more towards small-scale fishers. These included the sub-surface FAD, the Okinawa bamboo FAD and the Japanese International Cooperation Agency (JICA)/Caribbean FAD design. During this time, several issues were faced, including vandalism, high FAD costs, and difficulty deploying FADs due to limited availability of large vessels and irregular shipping between remote islands. Between 2012 and 2014, the Vanuatu Fisheries Department, with the cooperation of the JICA's Grace of the Seas Project, developed the Vatuika FAD – a lower-cost FAD designed to be deployed safely from small vessels (Figure 11). The Vatuika FAD is a combination of the upper floatation section of the SPC Indian-ocean design and the mooring and anchor section of the Caribbean design, with a few modifications. The Vatuika FAD has been described in detail in a SPC newsletter article (Amos and Nimoho 2015) and a copy of the Vatuika technical manual can be obtained from the Vanuatu Fisheries Department.

Key design features of the Vatuika FAD.

- The upper FAD section comprises 5–6 pressure floats, buffered with purse-seine floats (the number of floats was reduced to minimise cost and strain on the mooring line).
- The main line uses only 12 mm three-strand polypropylene rope to reduce water resistance and is readily available in Vanuatu. To create a catenary-like curve and sink down the mooring line (to reduce boat/fishing gear entanglement) sand-filled bottles are placed on the mooring line.
- The anchor system is comprised of a series of sand-filled bags, to enable deployment from small vessels and in remote locations (where sand is readily available).

Design and deployment notes

- The Vatuika FAD uses materials that can be sourced locally and enables deployment in remote locations.
- Able to be deployed nearshore or offshore.
- The three-strand rope tends to twist and kink, which weakens the rope, so swivels in the mooring line are required to prevent this. Hardware, such as swivels in the upper section of anchored FADs, has been identified as a FAD weak point, due to corrosion.
- Accurate placement and weight of the sand-filled bottles is required to ensure the polypropylene mooring line sinks at the surface and the catenary curve is created (see Table 6 on counter-weights when using only buoyant rope).
- The use of sandbag anchors is not appropriate where the sea floor surface is rocky, as the bags will quickly wear and break.