Submission: SR02-09

Offshore Special Regulation – 3.14.6

Lightweight non-steel lifelines
(Allow lifelines made from Dyneema® that are of equivalent strength to steel)

A submission from the Offshore Racing Congress

Proposal:

3.14.6 Lifeline Minimum Diameters, Required Materials, Specifications

a) Lifelines ~~shall~~ **may** be stranded stainless steel wire of minimum diameter in table 8 below. **Stainless** lifelines shall be uncoated and used without closefitting sleeving.
b) Notwithstanding 3.14.6 (a), temporary sleeving may be fitted provided it is regularly removed for inspection.
c) ***When stainless wire is used,*** *Grade 316* ~~*stainless wire*~~ *is recommended.*
d) A taut lanyard of synthetic rope may be used to secure lifelines provided the gap it closes does not exceed 100 mm (4 in). This lanyard shall be replaced annually at a minimum.
e) All wire, fittings, anchorage points, fixtures and lanyards shall comprise a lifeline enclosure system which has at all points at least the breaking strength of the required lifeline wire.
f) **Alternatively, lifelines may be made of double-braided Dyneema® rope of minimum diameter shown in Table 8 below.**
g) ***When Dyneema® is used, Grade SK75 or SK78 is recommended.***

TABLE 8

LOA	minimum ~~wire~~ diameter
under 8.5 m (28ft)	3 mm (1/8 in)
8.5m - 13 m	4 mm (5/32 in)
over 13 m (43 ft)	5 mm (3/16 in)

Current Position:
As above

Reason:
Dyneema® is a super-strong polyethylene fibre that offers maximum strength combined with minimum weight. It is up to 15 times stronger than quality steel and up to 40% stronger than aramid fibers (see table below), both on a weight for weight basis. Dyneema® is lighter than water and is extremely durable and resistant to moisture, UV light and chemicals. Due to the basic molecule of which it is composed, Dyneema® is virtually inert and cannot be damaged by moisture and UV light. This means that it does not oxidize and/or loose mechanical properties when exposed to atmospheric agents. Furthermore Dyneema® is used on a large scale in cut-resistant gloves. Gloves made with Dyneema® offer twice the level of protection demanded for the highest class in EN 388 standards.

Material	Diameter (mm)	Breaking strength	Weight (g/m)
Aramid	3 mm	900N = 0.90 tons	7
	4 mm	1500N = 1.50 tons	11
	5 mm	2300N = 2.3 tons	18
316 Stainless steel, 1X19 cable	3 mm	8160N = 0.81 tons	52
	4 mm	13150N = 1.35 tons	81
	5 mm	19050N = 1.95 tons	114
Dyneema SK75	3 mm	9500N = 0.95 tons	4.5
	4 mm	18000N = 1.80 tons	8
	5 mm	25000N = 2.50 tons	14
Dyneema SK78	3 mm	9500N = 0.95 tons	4.5
	4 mm	18000N = 1.80 tons	8
	5 mm	25000N = 2.50 tons	14

For all these reason lifelines made with Dyneema® are more durable and ensure maximum safety for the crew at minimum weight compared to steel wire lifelines. Use of Dyneema® is already important to the running rigging, sailcloth, block systems, and other components of modern offshore racing yachts, there are already some classes of high-performance keelboats (eg, Melges 32', Melges 24) which have successfully used Dyneema lifelines, and it was also used on several entries in the last Vendee Globe race. Use of double-braided rope also allows options for greater safety features, such as fluorescent and reflective tracers in the outer cover material.

Marc Guillemot, skipper of Safran during the last Vendée Globe, has said:
"I was very happy to use the fluorescent lifelines made with Dyneema. We used the lifelines during the last Vendée Globe for 25,000 miles; I thought it was the perfect product and very good for safety. Now we hope we can start with a similar product for the jackstay. The lifelines made with Dyneema were very light and strong and their performance lasted in time."