POLYSTEEL ATLANTIC LTD.
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To:	Dr. Ed Trippel
Date:	07-February 2021
From:	Sean Burke, President

RE: Sample Analysis of rope from whale entanglement

Thank you for facilitating the receipt by Polysteel Atlantic of a sample of rope retrieved from an entangled North Atlantic Right Whale in conjunction with our mutual goal of gathering as much information as possible regarding its original source in terms of geography and original use. The sample length was sufficient to make several observations in terms of manufacturing construction but was not of a sufficient length for us to determine a breaking strength although the construction will lead to some guidance on this characteristic. When applicable we have included comparative measurements and data from an unused sample manufactured by Polysteel Atlantic. We have used red notations on the pictures of the provided sample and yellow notations on our sample from inventory. Our findings are as follows:

Diameter of Sample

While the diameter may be altered somewhat by the fact that the sample was used and possibly stretched it did appear to be in fairly good condition and therefore the measurements should be accurate enough to draw a reasonable conclusion regarding the diameter. This can be validated through a comparison of the linear density and what would be an industry norm for a coil of the measured diameter. A measurement of the diameter using callipers indicated the sample was approximately 16mm which, in our industry, is the equivalent of 5/8 inch diameter. A small change in diameter from the original construction after a product is used and potentially stressed is normal. It is not uncommon for different manufacturers to have slight variations in the actual diameters of product due to the nature of the underlying extrusion process of the filaments.

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Linear Density

This process allow us to measure and compare the extrapolated weight of a coil of rope to a pre-defined standard. We use this process internally as a production quality verification procedure. In this instance we can use the calculation to provide additional assurance with respect to the diameter of the rope. Our process involved weighing a 1 foot sample of the provided product and calculating the equivalent weight of a 1200 foot coil which we then compared to our internal standards. The 1 foot sample weighed 0.0790 lbs which when multiplied by 1200 would indicate a full coil would weigh approx. 95 lbs. This is consistent with our own internal standards for a 5/8 inch diameter product of this type (a floating co-polymer material).

Manufacturer

While we were not able to determine a manufacturer based on the sample we were able to conclude that this was **not** a product manufactured by Polysteel Atlantic. This was done by examining the underlying construction of the sample compared to our own construction. Rope manufacturing involves 3 distinct processes:

1) Extrusion – this involves the melting of raw material and forming individual filaments. Manufacturers can use different sizes of initial filaments but the norm would be 3,000 Denier which is the size Polysteel typically extrudes and also what appears to be used in the sample.
2) Twisted Yarn – this product resembles a Baler Twine and is constructed by selecting a number of extruded filaments and twisting them together. Different sizes of twisted packages are used for different types of product construction with a fairly wide variety between manufacturers in this industry. This is typically how manufacturers can be identified or at least the list of possibilities reduced.
3) Rope – in twisted products this involves twisting a number of twisted yarn packages into individual strands of the rope and then twisting these strands together to form the end product.

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Polysteel Atlantic manufacturers 5/8 Diameter floating rope using 8 twisted yarn packages in each strand whereas the sample provided appears to used 19 twisted yarn packages. The Polysteel twisted yarn packages would use more individual filaments than those in the sample and thus be larger, allowing for a smaller number in the complete rope strand to achieve the same diameter. The difference in appearance is also noticeable when the products are compared side by side.

Lay Length of the Rope

The lay length is the measurement of distance between a full twist of the rope. This measurement is then used in conjunction with the diameter to calculate the Pitch of the rope which is indicative of the amount of twisting in the rope – the shorter the measurement the harder the lay. It is worthwhile noting that there are differences between manufacturers in how they use these measurements to label their products but they are a good indicator of how strongly twisted the rope is and what its potential use could be. Our educated guess would be that the sample provided is a medium or medium/soft lay product. The sample of Polysteel used in comparison is a soft lay rope and you can see in the pictures the longer lay length.

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Conclusions

- The sample provided appears to be a 5/8 diameter floating product (based on the absence of lead or polyester as well as the calculated weight of the coil).
- The sample appears to be a medium lay construction
- The sample was not manufactured by Polysteel Atlantic
- This type of product is used in a variety of marine related industries including the following:
    - Canadian crab fishery
    - Canadian lobster fishery (small quantities and specific areas)
    - US offshore lobster fishery
    - Ocean based aquacultures operations

Please do not hesitate to contact me if you have any questions or if we can be of further assistance.

Sincerely,
POLYSTEEL ATLANTIC LIMITED

Original signed by:
Sean Burke
President