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SWEDISH FORESTS, LUMBER INDUSTRY, AND LUMBER EXPORT TRADE

BY

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In 1918 a Swedish company, Aktiebolaget Refanut, was organized in Stockholm to exploit the patents of rafting sawn lumber. The idea of rafting sawn lumber is new, although rafting logs has been practiced for a long time on the Pacific coast of the United States, and in Finland and northern Sweden. Aktiebalaget Refanut conceived the idea of extending the rafting to sawn lumber during the war; in pre-war days the freight rates had been so low that there seemed to be a limited call for such a system. During the war freight rates advanced to such a height that the northernmost districts on the Gulf of Bothnia found it exceedingly difficult to have their stocks shipped, and many companies had more than 50 per cent of the annual production in their yards at the end of the shipping season. The time seemed opportune for an attempt to raft sawn lumber, and during the autumn of 1918 a huge raft containing approximately 4,200,000 board feet of sawn lumber, consisting mainly of fifth-grade stock, was towed from Haparanda district in northern Sweden to Copenhagen, a distance of about 1,000 miles. This raft was 365 feet long, 50 feet wide, and 25 feet deep, and had a draft of 15 feet 5 inches. It was constructed very solidly and bound with steel wire. The raft arrived in good condition, and the first attempt to raft sawn lumber was accomplished successfully.

As this matter of rafting is of vital importance to the lumber exporters in the United States, where attempts have been contemplated to raft lumber across the Atlantic, it may be of interest to consider a report made by Lloyd's surveyor in Stockholm in this connection. An extract from this report reads as follows:

> The bottom structure of the raft consists of four tiers of longitudinal beams or girders, each consisting of two tiers of 8 by 6 inch pine beams, bolted, the one tier on top of the other, by means of 1-inch screw bolts. These girders are connected crosswise by means of 8 by 8 inch beams and 1¼-inch screw bolts at the crossings.
>
> Forward and aft this bottom structure is pointed, the angles at both ends being 60°.
>
> On this bottom frame the first layer, consisting of 11 by 4 inch deals, is laid longitudinally, with the butts well shifted. The next, or second, layer is laid on top of the longitudinal layer at an angle of 30° on one side. The next, or third, layer is laid on top of the second one at an angle of 30° with the longitudinal direction, but on the opposite side. The next, or fourth, layer again is laid longitudinally, and so on.
>
> In addition, a few layers are dispersed throughout the body of the raft at right angles to the longitudinal direction.

It is assumed that by this distribution of the component tiers of the raft the longitudinal or bending stresses in the body, caused by the action of the waves, weight of deck cargo, etc., will be absorbed by the longitudinal tiers, whereas any tendency toward "corkscrewing" in a seaway, caused by waves striking in an oblique direction, will be counteracted by the diagonal and athwartship tiers.

Aktiebolaget Refanut's object was to test the question whether, practically speaking, the natural adhesion between the surfaces of sawn wood was sufficient, if supplemented by a reasonable amount of cable bindings, to withstand the disintegrating effect of long sea voyages, and it must be said that the result was satisfactory under the conditions encountered in the Baltic.

To quote again from Lloyd's report:

In the southern part of the Baltic, however, a sea rose 2 to 3 meters (7 to 10 feet) in height, and then the midship portion of the raft was found to rise and drop relatively on both ends within the limits of 2⅜ and 4½ inches between the extreme positions, thus showing that an actual deflection from the horizontal line of the deck took place of 4¾ inches as a maximum, a deflection which is thus practically equal to the deflection of the bottom, caused by a deck load of 198 tons, as ascertained through the soundings above recorded.

The observations appear to corroborate the opinion of the originator and the designer that the internal pressure between the component parts of the raft is sufficient for practically altering the friction or adhesion between these parts so much that it may be considered equal to the cohesion in a solid log or beam. In particular, the good elastic properties of the main body of the raft, if the weak, pointed ends be disregarded, is really striking and appears to support this theory materially.

Finally, Lloyd's report on the underwriting point of view states:

That rafts, of the general design shown on the appended plan, appear to possess sufficient rigidity to resist the action of even a fairly rough sea;

That the waves of about 10 feet in height, encountered on this first voyage with a lashed raft of sawn wood, termed "refanute," when striking against the bow and sides, have not caused any damage whatever;

That the working in a seaway of this raft more than 328 feet in length, and the periodical deflections from the horizontal of the main body of the raft between the wedge-shaped ends, are insignificant and probably less than those that may be observed on the hull of a cargo steamer of the same length, loaded with heavy cargo;

That the permanent set of the deck line is practically nil; and

That the network of steel wires has been found to be judiciously dispersed over the surface of the raft and has actually prevented any part of the surface wood from coming adrift or even loosening the firm adherence to the adjacent parts of the "refanute," which appears to be the "springing point" and the underlying principle of this new kind of transportation of sawn wood.

Provided that Aktiebolaget Refanut can satisfy underwriters that the same conscientious attention to details of stowing and binding together be given to future constructions, as has been bestowed on the "Refanut I," I consider the risk on insurance of this kind of craft—apart from the fact that about five-eighths of the "cargo" is or may be soaked with water from the outset—little if at all greater than that on the large deck cargoes of sawn wood, usually carried across the North Sea.

But I beg to emphasize that I do not recommend promiscuous insurance of this kind of craft, irrespective of its origin and construction. I understand that Aktiebolaget Refanut is patenting the main features of the new construction and have registered the name "Refanut" in different countries. Their future rafts, or "refanutes," will all bear this name with consecutive numbers, so that even their name will become a kind of guaranty of a certain type of raft and class of work in its construction.

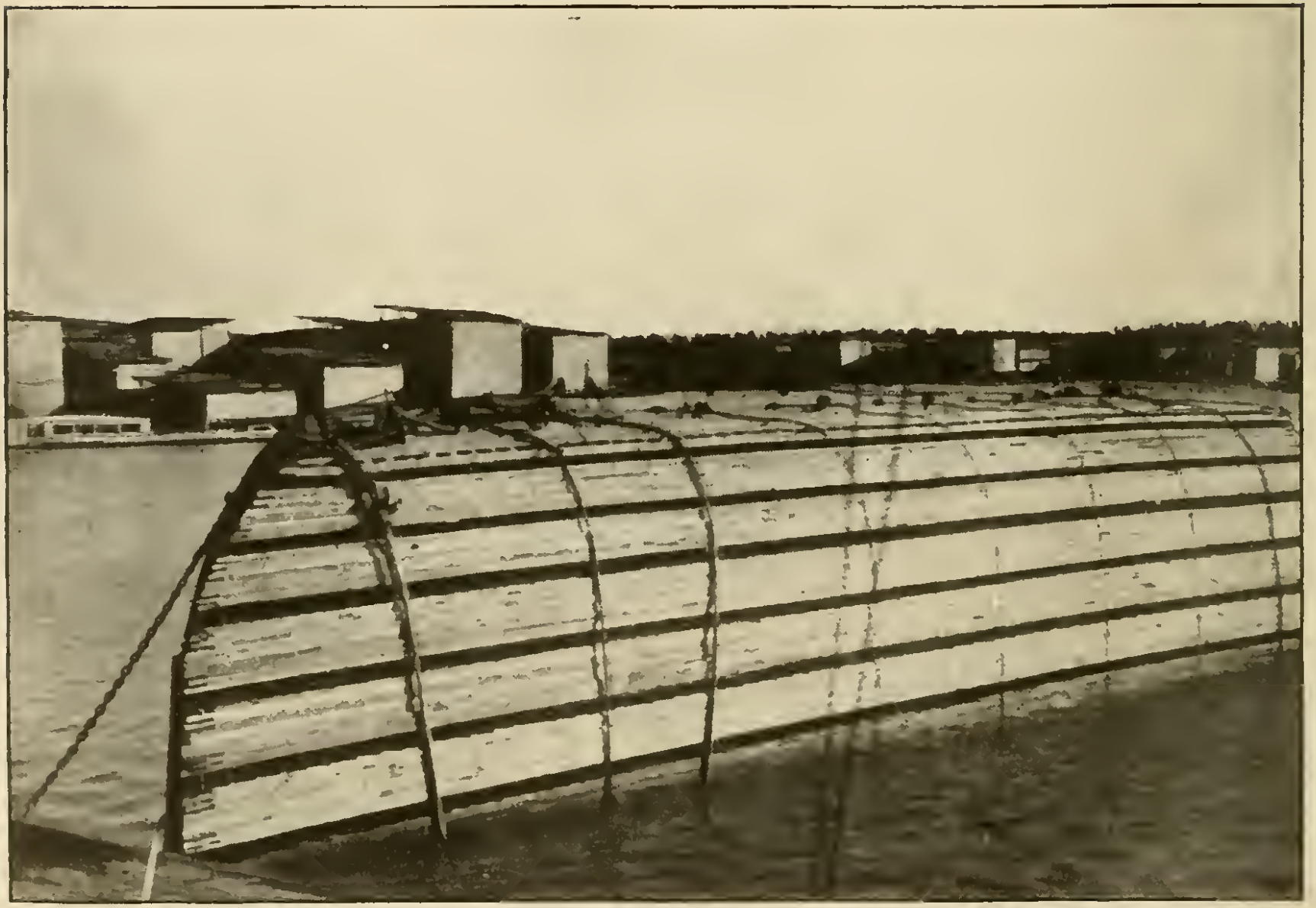
While a raft of logs once broken is hopelessly dispersed, sawn lumber has often shown an astonishing cohesion, and it is believed that in case of accident, the greater percentage of such rafts could be salvaged. Naturally the lumber will suffer somewhat from sea water, but recent improvements made on the Refanut will overcome these difficulties to a great extent. It is claimed that the freight on this raft from northern Sweden to Copenhagen was only one-fifth of

the freight rates for the same quantity of lumber carried in the regular way.

Early in the spring of 1919 a raft of sawn lumber, constructed on lines similar to the Refanut, was transported from Trondhjem in northern Norway to the east coast of the United Kingdom. Although the North Sea, which is very shallow, is one of the most difficult crossings to make, this rafting turned out successfully.

It appears that Aktiebolaget Refanut Co. intends to make further experiments to perfect this system and that this question has already been taken up with American interests by the Swedish company.

Figure 108 shows the construction of the first Refanut, which was towed to Denmark.



Courtesy of Refarnut A/B.

FIG. 103.—THE FIRST REFANUT LUMBER RAFT, CARRYING ABOUT 4,000,000 FEET BOARD MEASURE.