

## **Bakkafjöruferry; type and capacities, draught proposal.(2).**

### **1.1 General.**

When considering basic requirements for ferry transport navigating between Vestmannaeyjar and Bakkafjörú, it is proposed that, capacity and overall layout of the ferry on this route will be similar to the ferry presently servicing the route between Vestmannaeyjar and Þorlákshöfn, M/S “Herjólfur”, except for main dimensions and engine power of the vessel, as it is also envisaged that this vessel will be required to sail to Þorlákshöfn if, and whenever, necessary.

In the chapter on wavecharacteristics calculations, comparison is made of wave heights on these different routes, and, given the fact that, when the wave height is 3.5 m off Bakkafjörú coastline, the westerly wave is of maximum height 5.0 m on the route between mainland and Vestmannaeyjar and 7.5 m high on the free ocean outside. In southwesterly wave direction when the wave height is 3.5 m off Bakkafjörú, the wave rises to maximum 4.1 m on the route to Bakkafjörú and 7.9 m on the route to Þorlákshöfn; and the wave height is then 8.8 m on the ocean outside. In southerly wave direction when the wave height is 3.5 m off Bakkafjörú the wave height is highest 3.3 m on the route to Bakkafjörú and 5.3 m on route to Þorlákshöfn and the wave then rises to 6.1 m on the free ocean outside. In southeasterly wave direction when the wave height is 3.5 m off Bakkafjörú, the maximum wave height is 4.1 m on the route to Bakkafjörú and 3.0 m on route to Þorlákshöfn and then the maximum wave height is 5.3 m on the ocean outside. It is the southeasterly winds that have proved the most difficult to tackle and have caused delays and obstacles in the present Herjólfur ferry service, even if sometimes the southwesterly waves are bigger and more powerful. In easterly winds the sea is practically dead calm when sailing close to the mainland coastline between Þorlákshöfn and Vestmannaeyjar.

With this information i. a. as guidance, it has been possible to estimate the size and speed of the new ferry.

The Bakkafjörú ferry will be a conventional ro-pax ferry which will be able to run between Vestmannaeyjar and Bakkafjörú at two hours’ intervals each leg. Consideration will be given to stretching this interval to two and a half hours if deemed sensible during planning stages. The ferry will have a car deck accessible from both ends for through traffic. Above the car deck and partly on port side half way up, will be passenger saloons where there will be space for the maximum number of passengers the ferry would be designed to carry.

The bow of the ferry will be designed such that bow impact from the sea-surf off Bakkafjörú be minimized, since such occurrence could be very uncomfortable for passengers in high wave formations.

The classification of passenger ferries (97/C293/01) is made on the basis of wave height and sailing distance from the coastline.

The ferry will therefore be designed to navigate in navigational area “B” and will satisfy rules and regulations for the safety of passenger vessels for inshore navigation no. 666/2001. That will make it possible for the ferry to have unlimited navigational area, i.e. without limitations with respect to wave height, on navigational routes around Iceland, where the limit would be 20 nautical miles off a coastline where shipwrecked people could land.

## 1.2 Principal dimensions of the vessel.

As evident from information given by the Icelandic Maritime Administration (IMA) on results of research concerning the route and other environmental circumstances for Bakkafjörú, it is necessary to limit the draught of the vessel as much as possible and a fully loaded draught of 3.5 m is given as maximum.

Sediment transport into the port of Bakkafjörú is directly proportional to the width of the mole opening, which again bears relation to the beam of the proposed ferry. In order to limit the draught of the ferry and based on port design characteristics it is proposed that the beam of the ferry be limited to 15m

Concerning the length of the ferry, consideration is given to the required sailing time of about half an hour and the capacity of the ferry to transport passengers, cars and other transport vehicles as outlined below, and it is decided that a 62 m LOA vessel would fulfil those requirements. Given the above information the principal dimensions of the ferry with the required carrying capacities would be as follows:

Length overall	LOA	62 m
Length between PP	LPP	60 m
Beam	B	15 m
Draught	T	3.3 m

## 1.3 Speed.

The complete sailing route between Vestmannaeyjar and Bakkafjörú is 7 nautical miles, whereof a little in excess of 5 miles at full speed. Service speed for a vessel of the above dimensions will have to be 15 knots in order that the sailing time of thirty minutes between Eyja and Bakkafjörú be maintained.

## 1.4 Navigational capability, machinery and propulsive equipment.

Good navigational capability of the ferry in such a confined navigational area with strong currents within reefs and port, is paramount for the safety of the operation. It is therefore considered necessary to equip the vessel with two main engines, two propellers and two spade rudders of the Becker type and a powerful bow thruster.

The capacity of the propulsion engines will have to be somewhat in excess of the necessary power to make the above speed for the 62 m long vessel. It has been estimated by preliminary calculations that 2 x 1300 kW engines will be able to maintain 15 knots service speed of this vessel in normal sea conditions. Therefore two 1.500 kW main engines are proposed driving 3 m diameter propeller running at 180 RPM or thereabouts. In addition the vessel will have to be equipped with at least three independent energy suppliers/auxiliary generating engines, each capable of supplying necessary power to the bow thruster at full power.

In order to minimize risks during navigation, it is necessary to make demands to dependability and redundancy of the propulsive power and bow thruster, both with respect to careful design and construction as well as preventative maintenance of the ship and all its equipment.

## **1.5 Safety equipment.**

It is necessary to equip the vessel particularly well with safety equipment which can be mobilized as quickly as possible should the vessel meet a mishap or otherwise be endangered within the sandreef of Bakkafjörú. Life raft capacity is based on Viking Mass Evacuation System (MES) of 4 x 101 man liferafts, two on each side of the vessel on two different decks.

## **1.6 Carrying capacity.**

Given the proposed frequency of service (at least two round trips in wintertime and four trips in the summer), distribution of passengers and number of cars carried by M/S Herjólfur over all the months of each year, the minimum number of passengers should not be less than 250 and the ferry should be able to carry up to 45 passenger cars each trip.

Considering the standard norm for a passenger car space of 2.50 m width and a length of 5 m, and permissible maximum width of transport vehicles of 2.60 m, a 5-lane 50 m long car deck would comfortably cope with the transport of 45 passenger cars, or 25 cars and up to 2 x 50 m lanes for other vehicle transport. The carrying capacity of passenger cars could be increased somewhat by a suspended cardeck over one lane, however that may not be realistic in practice given the frequency of the trips across and the short sailing distance. Also, the use of such equipment would no doubt delay loading and unloading of the ferry.

Since the time of travel is short, the needs of the passengers are limited to seats only in two saloons, some with tables, and a coffee shop with a food server. For this service a small galley will also be provided with food freezer, refrigerator and a proviant store. Necessary sanitary spaces and luggage racks will also be provided.

Given the above dimensions of the ferry it may be possible to stretch the permissible passenger capacity to well over 300 passengers if so desired during the planning stages. However, in accordance with rules and regulations for passenger transport by ships, due respect will nevertheless have to be taken for seat capacity for passengers, sanitary facilities and safety and rescue equipment, in addition to safe manning.

## **1.7 Manning of the ship.**

Safe manning of the ship will be based on number of passengers, the same as it is now with M/S Herjólfur, so that minimum and maximum manning will satisfy both the given number of passengers and also all rules and regulations for manning in order that running costs of the ship be kept reasonably low. Preliminarily it is proposed that, the manning will be 7-10 crew depending on season and frequency of trips. Cabin space and service and sanitary facilities will be for all crew members. Consideration will also have to be given to the fact that the ferry will have to sail to Þorlákshöfn if necessary due to sea and weather conditions and that, the sailing time there is 2 <sup>3</sup>/<sub>4</sub> hours under the weather conditions then prevailing.

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