



Vessels 1 and 2 Update - 10 Dec 2016

- Kevin Hobbs and Jim Anderson met with FMEL Chairman Keith Mitchell and Managing Director Liam Campbell on the 09th December 2016 to discuss the projects.
- The gap between the contract delivery dates for Vessels 1 and 2 is 9 weeks. In CMAL's professional opinion and experience of similar sized Ro-Pax vessel projects; with the current progress and strategy, it will take something extraordinary to deliver the vessels 9 weeks apart. European shipyards, such as Flensburg would require a 3 to 4 month gap between deliveries for bespoke type vessel designs.
- The original aim of FMEL was to advance outfit and fit equipment early in the programme, deliver Vessel 1 early, to leave a bigger gap between delivery of Vessels 1 and 2. This is no longer possible with current strategy. The shipyard will require additional time to deliver Vessel 2 and very possibly for Vessel 1 also unless there is change in strategy. **With current strategy and target delivery dates, lessons learned from Vessel 1 will not be picked up in time for Vessel 2.**
- Fabrication milestones are behind schedule.
- Fabrication milestones cannot be taken in isolation as an indication of progress. The yard redevelopment, pre-outfitting of blocks, equipment deliveries and installation, design and issue of drawings is several months behind schedule.
- The delay in all of these parts has severely impacted on the original strategy and as such the overall progress for both vessel is several months behind schedule.
- FMEL resources: FMEL have had difficulties in recruiting people with necessary skills. FMEL Design Manager is managing on his own many aspects of the design and technical requirements; Naval Architecture, Machinery, Mechanical, Drawing office and often Electrical.
- Quality of Welding is excellent.

Vessel 1 - Production milestones - Actual progress compared with schedule

YARD NO. 801

Milestone	Original Scheduled Date See Note 1	Revised Scheduled Date See Note 2	Revised Scheduled Date See Note 3	Actual Date	Comments
Cutting of Steel	15 Dec 2015	15 Dec 2015	-	15 Dec 2015	Achieved on original scheduled date Rev 01
10% Fabrication	18 Apr 2016	13 Jun 2016	-	10 Jun 2016	Achieved 2 months later than original schedule Rev 01 Achieved in line with revised schedule Rev 03
25% Fabrication	14 Jun 2016	26 Jul 2016	-	04 Aug 2016	Achieved 2 months later than original schedule Rev 01 Achieved in line with revised schedule date rev 03
35% Fabrication	15 Aug 2016	12 Sep 2016	-	06 Oct 2016	Achieved 8 weeks later than original schedule Rev 01 Achieved 4 weeks later than revised schedule Rev 03
50% Fabrication	14 Oct 2016	14 Oct 2016		09 Dec 2016	Achieved 2 months later than original and revised schedules
Major Equipment and Lock Out Items Installations	14 Nov 2016	13 Mar 2017 to 18 Jan 2018	-		Delivery dates of all major equipment are awaited from FMEL. "Installation" of all the "Major Equipment" has not been commenced on the 14 th November 2016 as per original plan. Major items of Main Propulsion are expected to be "delivered" (not installed) on the 19 th December 2016; these are the Main Engines, Auxiliary Engines and Shaft Alternators. The original plan from FMEL was to install the major equipment early and advance outfit. This has not happened and is the biggest risk to achieving the contract delivery date.
75% Fabrication	15 Dec 2016	15 Dec 2016	10 Feb 2017		Now scheduled 2 months later than original plan
100% Fabrication	16 Jan 2017	16 Jan 2017	16 June 2017		Now scheduled 5 months later than original plan
Berth Join Up	14 Mar 2017	28 Apr 2017	14 Jul 2017		Now scheduled 4 months later than original plan
Hull Inspection Prior to Paint	17 Apr 2017	26 May 2017	21 Apr 2017		Latest date given by FMEL is back in line with original programme.
Launch	14 Aug 2017	24 Aug 2017	24 Aug 2017		We expect that the vessel will be ready to launch by this date. However the status of the drawings, outfitting and installation will be several months behind schedule.
Delivery	25 May 2018	29 Jun 2018	25 May 2018		Latest date given by FMEL is back in line with original programme.

Note 1: From Cardinal Programme Rev 01 dated 14 Dec 2015

Note 2: From Cardinal Programme Rev 03 dated 16 May 2016

Note 3: Email from FMEL 09 Dec 2016



Vessel 2 - Production milestones - Actual progress compared with schedule

YARD NO. 802

Milestone	Original Scheduled Date See Note 1	Revised Scheduled Date See Note 2	Revised Scheduled Date See Note 3	Actual Date	Comments
Cutting of Steel	15 Dec 2015	15 Dec 2015	-	15 Dec 2015	Achieved on original scheduled date Rev 01
10% Fabrication	18 Apr 2016	13 Jun 2016	-	10 Jun 2016	Achieved 2 months later than original schedule Rev 01 Achieved in line with revised schedule Rev 03
25% Fabrication	14 Jun 2016	02 Aug 2016	-	04 Aug 2016	Achieved 2 months later than original schedule Rev 01 Achieved in line with revised schedule date rev 03
35% Fabrication	15 Aug 2016	26 Sep 2016	-	06 Oct 2016	Achieved 8 weeks later than original schedule Rev 01 Achieved 2 weeks later than revised schedule Rev 03
50% Fabrication	14 Oct 2016	18 Nov 2016	20 Jan 2017		Now scheduled 3 months later than original plan
Major Equipment and Lock Out Items Installations	14 Nov 2016		TBA		Delivery dates of all major equipment are awaited from FMEL. "Installation" of all the "Major Equipment" has not been commenced on the 14 th November 2016 as per original plan. Major items of Main Propulsion are expected to be "delivered" (not installed) on the 19 th December 2016; these are the Main Engines, Auxiliary Engines and Shaft Alternators. The original plan from FMEL was to install the major equipment early and advance outfit. This has not happened and is the biggest risk to achieving the contract delivery date. That and the gap between delivery dates between Vessels 1 and 2.
75% Fabrication	15 Dec 2016	19 Jan 2017	05 May 2017		Now scheduled 6 months later than original plan
100% Fabrication	16 Jan 2017	20 Feb 2017	20 Oct 2017		Now scheduled 9 months later than original plan
Berth Join Up	14 Mar 2017	05 Jan 2018	14 Dec 2017		Now scheduled 9 months later than original plan
Hull Inspection Prior to Paint	17 Apr 2017	02 Feb 2018	24 Nov 2017		Now scheduled 7 months later than original plan
Launch	12 Oct 2017	20 Mar 2018	12 Jan 2018		No space to have 2 vessels at outfit berth at the same time. Outfitting and installation will be several months behind schedule.
Delivery	26 Jul 2018	29 Aug 2018	26 Jul; 2018		Date given by FMEL is back in line with original programme.

Note 1: From Cardinal Programme Rev 01 dated 14 Dec 2015

Note 2: From Cardinal Programme Rev 03 dated 16 May 2016

Note 3: Email from FMEL 09 Dec 2016

Milestone No.9 - Major Equipment and Lock Out Items Installations

For the following major groups of equipment, “installation” would commence on both Hulls 801 and 802 on the 14th November 2016.

List of Major Equipment:

1. Main Propulsion
2. Manoeuvring Equipment
3. LNG Tank
4. Electrical Distribution
5. Ramps
6. Power Management
7. Navigation
8. Fire Safety
9. Lifesaving and Communication.

“Installation” of all the “Major Equipment” listed above has not commenced on the 14th November 2016 as per original plan. Major items of “1. Main Propulsion” for Hulls 801 and 802 are expected to be “delivered” (not installed) on the 19th December 2016; these are the Main Engines, Auxiliary Engines and Shaft Alternators. We await delivery and installation dates for the other items in “1. Main Propulsion”, namely: the Propellers, Gearboxes and Shaft-lines.

We do not consider the following main equipment items as being an essential part of milestone event No.9:

6. Power Management System
7. Navigation
8. Fire Safety
9. Lifesaving and Communication,

We have asked FMEL for their plans for the delivery and installation of all the other major equipment stated in Milestone Event No.9:

1. Main Propulsion (Propellers, Shaft-lines and Gearboxes)
2. Manoeuvring Equipment (Rudders and Thrusters)
3. LNG Tank
4. Electrical Distribution (Electrical Switchboards)
5. Ramps

Comparison of Hull Nos 801 & 802 with MV Loch Seaforth

Ship	Contract Signing Date	Launch Date	Delivery Date	Duration Launch to Delivery	Contract Duration	Months to Delivery from 10 Dec 2016	Late Delivery No of Days in Contract	Delivery Date (inc 80 days)
Tender Stage 801	01 Jun 2015	28 Oct 2016	03 Nov 2017	12 months	29 months			
Tender Stage 802	01 Jun 2015	27 Oct 2017	17 Aug 2018	9.5 months	38.5 months			
801	16 Oct 2015	22 Aug 2017	25 May 2018	9 months	31.5 months	17½ months	80 days	13 Aug 2018
802	16 Oct 2015	?	26 Jul 2018		33.5 months	19½ months	80 days	14 Oct 2018
MV Loch Seaforth	21 Jun 2012	21 Mar 2014	24 Oct 2014	7 months	28 months			

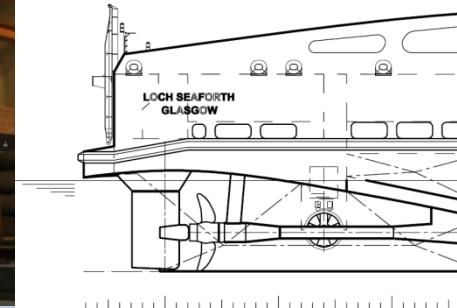
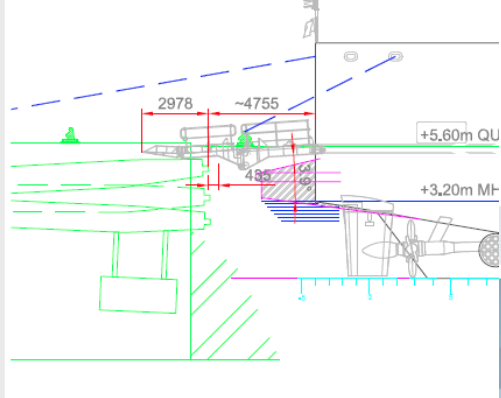
The latest propulsion power predictions for Vessel 1 and 2 are 10% more than the previous predictions.

The power increase seems to be a result of:

1. Much higher blade area ratio on the final design propeller, the Increased BAR is required for control of cavitation (Noise and Vibration).
2. Larger diameter stern tube and “thicker” rudder than was anticipated at start of the project.
3. 2 deg shaft rake (initial predictions on horizontal shaft) is leading to higher dynamic head trim. This results in less efficiency of the bulbous bow.



To bring the power propulsion power back in line with contract requirements, FMEL have modified the model; stern lines, added a 2.4m ducktail, a 50mm interceptor and modified the bulbous bow. The duck tail arrangement is similar to the arrangement on Loch



- Vessel Names, Vessel Naming Competition
- Launch
- Hull 801 - 17½ months to delivery.
- Hull 802 - 19½ months to delivery.
- Fabrication programme, Hull 801 consolidation, planned for end June 2016. 6½ months from now.
- Fabrication programme, Hull 802 consolidation, planned for end Oct 2016. 10½ months from now.
- Next fabrication milestones, Hull 801, Milestone No. 9, 75% Fabrication, Now scheduled 2 months later than original date.
- Next fabrication milestones , Hull 802, Milestone No. 8, 50% Fabrication, Now scheduled 3 months later than original date.
Milestone No.9, 75% Fabrication, Now scheduled 6 months later than original date
- Equipment Deliveries & Installations, several months behind schedule.
- Delay in Basic Design Drawings, several months behind schedule.
- Model test Nov 2016, 10% increase in power from contract condition.
- Outfit Plan and Commissioning Plan still to be produced by FMEL