

**April 13, 2020**

## **DEAR CAPT'N ABBY**

Capt'n Abby: The Abegweit is a pretty big ship. And it had to overcome massive winter ice dams in the Northumberland Strait. Where did the power come from to turn those four huge and heavy propellers?

Capt'n Abby: The quick answer to your question is that the Abby's propulsion power comes from diesel generators and electric motors, which at it's 1947 launching was "state of the art". However, that barely touches the surface of the whole answer. In the explanation following, we'll take an imaginary tour through the engine deck that holds the components that together answer your question.

The engine deck is pretty close in length and height to the rail deck above it (where you enter the ship). If you ignored the walled partitions on the rail deck, you've got over 300 feet of length. Well, the engine deck below is probably just as high and just as long. So, let's start our imaginary tour of the engine deck.

After descending from the rail deck about a dozen steps, you'll come upon an engine deck mezzanine-level engine control room. Gauges, levers and switches there can monitor and control much of the ships engine power plant. There are windows in the control room facing the stern where one can view a part of the forward engine room.



Notice in the picture above that the engine control room has four throttle controls on two pedestals nearly identical to those on the bridge. They were there "just in case". The Abby could be blindly powered ahead or astern from the engine control room while still being steered or helmed from up on the (navigation) bridge.

Above the controls and suspended from the ceiling of the engine control room are four "telegraphs" very similar but inverted to telegraphs located up on the bridge (depicted in the picture to the right). When a helmsperson on the bridge moved the bridge telegraph lever to indicate a speed and direction (ahead or astern), a corresponding lever action is reflected in the engine control room. Keep in mind, though, that these telegraphs only did exactly what they are called. They 'telegraphed' or transferred a navigation command order from the navigation bridge to the engine control room. It was a visual queue from the bridge to the control room. An engineer in the control room would acknowledge this command by first echoing it back on the control room telegraph (which would be reflected on the bridge) and then control the propulsion of the Abegweit directly using the four control room pedestal throttles. Each of these throttles individually control massive electric motors (more on this coming up).



In the following picture, two expert helmsmen - one (left) on a telegraph and the other on a throttle -- are taking the Abby for an imaginary spin. Notice the two throttle pedestals similar to those in the engine control room.



Now let's go over the diesel electric power plant that makes the Abby move. First and most important is the Dominion Sulzer (D-S) TS-29 diesel engine. This engine has twelve cylinders, divided into two banks. Mounted between the two banks is another crucial component, the electricity generators. The diesel engine works in conjunction with this generator -- the diesel turning the generator shaft, which in turn produces electricity. More on this later. This Dominion Sulzer (D-S) power plant is pretty big. You can see about a third of this engine in the classic picture below with Merchant Mariner Jules Traut standing in front (who by the way, worked

the engine room on the Abby's memorable trip to Chicago in 1983 which has been chronicled on YouTube [HERE](#)).



To give you another perspective of how large these diesels are, a single piston is about a foot in diameter and just over four feet long. For comparison, the piston in your car might be smaller than a can of frozen juice concentrate with a Popsicle stick sticking out of it. And remember that there are twelve of these pistons in each D-S diesel.

Now that you might have an idea of how large one D-S diesel engine is, consider that the Abegweit had eight (8) of them. That's right, eight! Four each in two bulkhead-separated engine rooms. That's quite a bit of power. Did these eight engines drive the propellers that moved the Abby? Well, kinda, but not directly.

Simply put, the Abegweit's eight huge 12 cylinder D-S diesel engines ran at a pretty high "RPM" with its primary purpose to turn the generators, which produce the electricity that the Abby needed to move. That's pretty much what the diesels job was -- to produce lots of electricity. Now we'll cover why the Abegweit needed so much electricity to move as well as the real power behind the Abby's propulsion.

Near the stern of the Abegweit, there's a whopping 3,850 HP electric motor on the port side. It's attached to a highly forged 16 inch steel shaft and that shaft goes out the stern and is directly attached to the 13 foot port propeller. How big is this motor? It's partially shown in the picture below along with it's propeller shaft-- it's close to twenty feet tall and about twelve feet across as well as twelve feet deep. That's just one motor! It's huge! And at maximum cruising speed of just over 16 knots (~18 mph), this motor turned that nickel steel propeller about 155 revolutions per minute.



But wait, there's more! There's another identical motor on the starboard side, also attached to a 16 inch forged steel shaft, which goes out to the 13 foot starboard stern propeller. And once more, there's more. Remember that the Abegweit's bow also has two propellers? Well, there are two more identical motor-shaft-propeller assemblies up there as well. All four electric motors are remote controlled from the navigating bridge (at the bow) or

docking bridge (at the stern) or from the engine control room using those four throttles on the two pedestals.

Normally, two generators drove each motor, but if necessary three generators could drive any of the motors and the control room could reassign them providing even more power to that prop. As pointed out earlier, combining diesel and electric power to provide ship propulsion was quite "state of the art" back in the early 1940's. What was its advantage? What a diesel electric brings to the table is its ability to provide it's maximum torque (rotational power) at zero RPM (from a stand-still).

So, I can finally answer your question -- how did the Abegweit get around? It was able to move with agility using four propellers, each independently driven by massive electric motors. And the source of that electricity was two engine rooms, each containing four Dominion Sulzer diesel-electric engines. Furthermore, utilizing this diesel-electric technology an experienced captain could make the ship move in circles, sideways or other ways by controlling the four props and what direction each was turning and what speed it rotated.

Capt'n Abby (Sheltered in Place) April 2020