

## Conversion of Inland Waterways Vessel “Somnium Vitae” to `Ironmen´ Engine



**Who:** Hans Robert Bell, inland waterways boatman and owner of the “Somnium Vitae“, a 172-meter barge-train

**What:** 12-cylinder Series 4000 `Ironmen´ engine

**Why:** Trials with a pre-series Ironmen engine under actual working conditions

**Where:** Inland waterways in Germany



**Continuous development of MTU’s Series 4000 engines led to the market introduction of its `Ironmen´ units – powerful, long-lived and reliable engines which fulfill the new emissions regulations and still manage to distinguish themselves with outstandingly low operating costs. Inland waterway vessel owner Hans Robert Bell was the first to test a model 12V 4000 M53 MTU engine. The unit, which produces 1,380 kW, has been demonstrating exactly what it is capable of since it was fitted on the 172-meter barge train `Somnium Vitae´ in April 2009.**

Germany – The “Somnium Vitae” represented the fulfillment of Hans Robert Bell’s lifetime ambition. As a small boy in the seventh generation of a family of inland waterway boatmen, he had dreamed of one day operating his own large vessel. His dream was realized in 1989 when he bought the 100-meter “Genfer See”, re-christened her the “Somnium Vitae” and had her extended by 70 meters to ensure that she would remain a viable commercial proposition. Since then, Bell has navigated the Rhine, Danube, Moselle and Weser rivers many times, transporting cargos like cut or shredded scrap between locations such as Koblenz in Germany and the French city of Nancy. In 2006, Bell had a new engine installed in his boat – an MTU model 12V 4000 M60 unit delivering 1,320 kW at 1,800 rpm. Three years down the line, MTU had developed the

Series 4000 still further so that it was now even cleaner and more cost-efficient. In addition, it met all emissions regulations valid around the world and was therefore perfectly prepared for future demands. The developers had also set themselves the targets of reducing fuel consumption below 200 g/kW and increasing TBO as well as maintenance intervals.

### **Trials under actual working conditions**

In order to test the new Series 4000 `Ironmen´ under actual working conditions and to make a direct comparison with the previous model, MTU engineers suggested repowering the Somnium Vitae. The old engine was due for inspection in any case and Bell was convinced that the low operating costs associated with the `Ironmen´ would mean tangible benefits. When it comes

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MTU Series 4000 'Ironmen' engines are available in 8, 12 and 16-cylinder versions with power outputs ranging from 760 kW to 2.240 kW.

down to it, fuel costs account for the lion's share of operating costs so low consumption is obviously a major issue when boat owners are choosing a new engine. The most important factor, however, is engine reliability. If the vessel's owner wants to keep his customers, he has to deliver his cargo to the designated destination on time. "If my boat is laid up, I can't meet my customers' needs on time, I lose orders and, sooner or later – my boat too," explained Bell.

#### State-subsidized repowers for low emissions

With future emissions regulations in mind, achieving the lowest possible particulate, NO<sub>x</sub> and CO<sub>2</sub> emissions is becoming increasingly important. Like all MTU engines, the 'Ironmen' are among the cleanest diesel units in the world and that benefits not only the environment but the vessel's owner, too. Thanks to a state-sponsored program for lower-emissions from diesel engines on inland waterway vessels, Bell was able to receive a subsidy toward repowering the Somnium Vitae from the German Ministry of Transport, Building and Urban Affairs. The condition was that the new engine had to undercut the relevant particulate limits set by the Central Commission for Navigation on the Rhine (CCNR), Stage II, by 30 percent.

Along with the CCNR targets, 'Ironmen' engines are also compliant with EPA Tier 2, IMO and EU Stage IIIA emissions regulations. And, as an option, the engine can also be equipped with exhaust aftertreatment technology such as particulate filters which will prepare it for upcoming emissions legislation. Series 4000 engines are available in 8, 12, and 16-cylinder configurations

and operate in workboats such as tugs, inland waterways vessels and other applications which demand especially reliable, long-lived propulsion solutions with high levels of availability, long maintenance intervals and low operating costs.

#### Proven in practice

The new 12-cylinder engine has now been powering the Somnium Vitae since April 2009 and has long since demonstrated its reliability (the unit is in operation for at least 16 hours a day). It also runs much more smoothly than its predecessor: "Before, the intake noise from the turbochargers was like a loud whistle – that has now disappeared," said Bell and added "technologically, the 'Ironmen' engine is simply the best in its class." The vessel's owner is also completely satisfied when it comes to operating costs and maintenance. The first major overhaul was only due after 33,000 hours of operation and with its fuel consumption of 195 g/kWh, the 'Ironmen' engine has proved to be extremely frugal.

To ensure that the Somnium Vitae's propulsion system continues to run safely and reliably in the future, Bell arranged an individual maintenance contract with MTU which covers all maintenance costs. "MTU even covers unforeseen faults," enthused Bell. And to make sure that such faults never become a reality, a remote engine monitoring system was installed on board which logs all major engine data and transmits it to the MTU server via the mobile phone network. MTU technicians use remote scans to identify the engine's performance and operational data

and can react immediately if anything seems wrong. A well-structured service network throughout Europe means that a repair order can then be placed with the nearest service center within the fastest possible time.

For Hans Robert Bell, repowering the Somnium Vitae has been well worthwhile – not merely because the vessel now has a new and powerful propulsion unit, but also in financial terms. Thanks to state subsidies, Bell was able to save 36,000 Euro (20,000 Euro for installation and conversion costs alone) whilst the reduced operating costs mean that the repowering project will pay for itself over the longer term. Economic pressure and the struggle to win orders have become much more intense and the market has seen a significant decline in prices. "The MTU engine was also a big help there because it simply uses less fuel than other engines and that keeps our expenditure down," explained Bell.

The logic that the engine is a viable proposition over the longer term because it is more cost-efficient, likewise proved a convincing argument for Robert Bell's brother, Martin, who is also an inland waterways boatman. He has also bought an 'Ironmen' 12V 4000 M53 engine which is scheduled for installation in his boat, the 'Navi-gare', at the Braun shipyard in summer 2011.

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