© Vestergren

Rolf Vestergren
is former Director and Vice President of Wärtsilä Corporation and an elected member of the Collin Trust, whose lecture is a regular highlight of every CIMAC Congress

35 Years of Large Engine Progress

In June 2016 the CIMAC World Congress returns to Helsinki after an interval of 35 years.

For engine industry veterans like myself, for whom these 35 years represent the best part of our careers, I can confirm to younger colleagues that it will be a very different large engine industry that visitors to the Finlandia Hall will experience, compared to 1981.

Then, the effects of the energy crises of the 1970s were still casting a shadow, not least in terms of the quality of fuels. HFO was still causing problems, but the first ships using residual fuel for both propulsion and on-board power generation were already at sea. Hard to believe, then, that the current price of crude oil is so close to the 1981 level in US dollars if not real terms!

At the same time, however – and paradoxically in view of the increasing use of heavy fuel – the first moves were being made towards the reduction of noxious exhaust emissions. And so, overall, although emphases have shifted, the aims of engine development have remained largely the same in the past 35 years: fuel efficiency: power density; exhaust emissions.

What is really unrecognisable, however, is the corporate and geographic make-up of the engine industry. In 1981 we counted large engine builders in medium double digit figures. But clearly, the industry was ripe for concentration, and in the years up to the new Millennium, major builders of large engines could soon be counted on two hands.

One major effect of this has, of course, been the emergence of Finland as a global centre of engine design, development and manufacture. And most recently this development has gone further with the evolution of Wärtsilä, Finland's flagship large engine builder, into an exponent of not only marine propulsion systems but complete vessel designs.

However, while European companies still have a strong claim to be at the centre of gravity of engine technology, the early 1980s also saw an accelerating and irrevocable migration of shipbuilding, the largest market for large engines, to the Far East – a process which continues to be consolidated to this day.

Moving to the present and the future, as represented by the papers to be presented at the Congress, what is striking in the current phase of engine development is that even after well over 100 years of continuous development, quantum leaps are still possible, as evidenced by the widespread adoption of the Miller Cycle and its enablers.

A great deal of this happy situation derives from the fact that the digital revolution occurred just as the engine industry was grappling with exhaust emissions reduction. First it was the control possibilities of microprocessors that enabled advances in engine management, like the advent of common rail fuel injection and VTG. Now it is the communications potential of the digital revolution which is set to provide engine designers and developers with unprecedented and almost limitless insights into the actual performance of large engines in their applications, They now have the means to optimise the operation of prime movers on ships, generators or locomotives under all conditions.