

## UNPRECEDENTED AND EXCLUSIVE ADVANTAGES OF THE SIAMESE ENGINE IN DIESEL MODE

### Authors

---

Edouard BONNEFOUS<sup>1</sup>,  
<sup>1</sup>France

### Abstract

---

The diesel engines, by principle, are not prone to the rattling. However, with a powerful system of overfeeding, the limit of pressure of cylinder head is quickly reached. But to be able to start and function under atmospheric load, the compression ratio – fixed – cannot be lowered. The parade is the delayed injection, but much less effective. The VCR is thus useful for the diesel. Firstly, among VCR architectures with piston known, one distinguishes 2 categories according to the movement of the rod big end: circular or unchanged and oval, narrow or linear. The later category, although more penalizing the cubic capacity mass, authorizes [stroke / bore] ratio larger, to decrease [surface / volume] ratio of the combustion chamber and thus to decrease the associated thermal losses and thus to increase efficiency. The Siamese engine easily achieves a [intake stroke / bore] ratio up to 1,7. Secondly, a limit of the diesel engine lies in the time of ignition of the fuel, as VCR preserves the quasi – sinusoidal temporal trajectory of the piston, the maximum rating is 4500 rpm. Siamese architecture is new in this direction, because the movement of the piston is slowed down at TDC of injection and at the beginning of power stroke. All occurs as if the traditional quasi – sinusoid were found, but while turning 40 % more quickly! Consequence, the maximum rating of the Siamese diesel reaches the 6300 rpm. The specific power is thus directly improved of 40 % compared to the other VCR. Moreover, the Siamese ensures a true Miller – Atkinson cycle, by an overrunning of the piston during power stroke. A detailed study of the connecting rod assembly, shows that, by its effects of rolling up and its conformation, frictions and efforts remain on the same level as those of traditional crank – rod. On a turbo – overfed diesel, the Miller – Atkinson cycle improves the efficiency from 10 to 15 %. Also, the reduction in the [surface / volume] ratio by the increase in the [intake stroke / bore] ratio combined to the fall of the compression ratio, would improve the efficiency up to 11 %, in spite of the downsizing. Conclusion, while cumulating, the specific fall of consumption of a Siamese turbo – overfed diesel would exceed 20 % at full load and with a better specific power, increased by easily more than 60 %. 2 examples of automobile Siamese engine quotations and the Siamese architecture are presented.