



## Engineering services

- **Thermodynamic engineering** (including **hydraulics**) of **rolling-stock**, especially of **diesel railcars** (including heating and **air-conditioning systems**), diesel locomotives, and **track maintenance vehicles**.
- **Before-purchase analysis** of **diesel-powered rolling-stock** so that railroad companies in their contracts with manufacturers can stipulate **specific faults to be eliminated** and where **higher-quality components** are to be fitted. This means that, despite higher first cost, considerably **lower life cycle costs** can be achieved (lower maintenance costs, higher availability etc.).
- **Thermodynamic re-engineering** of **problem-ridden rolling-stock**, especially of **diesel railcars** and **diesel locomotives**.
- **Adaptation** of existing **diesel locomotives** and **diesel railcars** to **new diesel engines** (including all necessary alterations to **engine cooling systems** and **hydraulics**).
- **Adaptation** of existing **locomotives** and **railcars** to **new air compressors** and their auxiliaries (**KNORR-compressors** and -systems), if the old types are no longer available or if the option of **oil-free compressors** is wanted. Possible **thermal problems** in the original lay-out are identified and **eliminated**.
- Experimental testing and **engineering/re-engineering** of **engine and auxiliary unit suspensions**.
- **Reduction of sound transfer** from the engine or auxiliary units to the vehicle structure in order to **reduce noise emissions**.
- **Modernization** of **steam locomotives** in **tourist traffic** in order to **increase thermal efficiency** and **lower running- and maintenance-costs**, including **conversion to L. D. Porta's gas-producer combustion system (GPCS)** or the proprietary **SePhys oil-firing system**.
- **Engineering and manufacture** of **SePhys burners** for **special applications** in the use of **liquid fuels**, e.g. for **multiple fuel operation** with **extra light (No. 2) heating oil/vegetable oils/waste animal fat**.
- **Development of concepts** for **thermally driven vehicles** and **thermal plants** including coverage of **physical chemistry**.
- General **thermodynamic design- and demonstration-calculations**, e.g. for **radiator design**, **pyrolysis** and **gasification** of **municipal solid waste (MSW)**, or **fire protection**.

## Services include:

**Assessment of engineering concepts** of to-be-built and existing vehicles/plants; **assessment of improvement potentials; design calculations; design and/or selection of components** and their **installation in a prototype at the customer's location/workshop** in co-operation with his foremen and skilled workers, if this is wanted; **experimental proof** of engineering concepts or improvements and **component tests** in both **trial runs** and **regular service**. Series production and series reconstruction can be supported but may also be carried out under the customer's own management and responsibility.

## Additional railroading know-how:

- Proprietary **mathematical model of heat transfer** (both radiative and conductive; including heat dissipation) from **brake discs** to wheels, especially important in the case of **radialelastic wheels**, i.e. wheels with integrated rubber springs (this model matches very well experimental values obtained by **KNORR-Bremse** und **DB**).
- **Reduction of noise emissions** from **diesel-powered rolling-stock**.
- **Reduction of smoke emissions** from **old diesel locomotives** (especially under full-load conditions).
- **Onboard emission measurements** on **diesel locomotives** and **diesel railcars** in **regular service**.

## Fee:

**1600 € per 8-hour day** + travel expenses.

**Volume discounts** for block orders of more than 60 days upon request.

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