



## 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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