

Environmental Requirements Placed on Vehicle Manufacturers

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Trucks and the environment

Heavy commercial vehicles have sometimes been designated as "big, smoky, noisy and ugly" by popular sentiment. Any good TV-channel has at one time or another had a feature on some of the inadequencies of the transport systems in a modern society, where 40-tonners might travel practically unladen due to cabotage rules or lack of proper transport logistics. As a truck manufacturer, this criticism cannot be taken lightly (or you may not survive).

Indeed, environmental declarations and action programmes are asked for by several interested parties:

- **The owners**, notably stock market analysts searching for hidden liabilities,
- **The co-workers**, notably younger generations who expect to work in an environmentally conscious corporation,
- **The society**, in Europe the legislators of the European Union,
- **The local community**, e.g. Heidelberg, Södertälje or Wellington,
- **The customers customer**, i.e. the **transport buyer** who is increasing his demand on the transport part of the environmental life cycle of his product.

The truck manufacturer has to take all this to his heart. The consequence is that today there is and for the foreseeable future there will be no stronger technology-driving factor than the environmental issue. Top corporate policies are changed to state that legal demands shouldn't only be fulfilled but fulfilled with a margin. All aspects of production as well as product development are affected. A large part of product development investments are dedicated to environmental improvements.

Leaving actual production aside (although some interesting changes have been done in e.g. painting processes): how is this affecting the

truck/tractor in the nearest future? You can easily rank the environmental impacts of a truck. **The fuel cycle**, from fossils to emissions, has the highest environmental impact by far. Each kilogram of fossil fuel will generate more than 3 kilogrammes of carbon dioxide (by simple physical/chemical calculation). Depending on fuel quality and the design of the combustion process other emissions will be generated as well: nitrogen oxides, hydrocarbonates, sulphurs, particulates. These secondary emissions (with local impact, as opposed to carbon dioxide which has a disputed global impact) are regulated in Europe by Directives: Euro II, III, ...

But just fulfilling legal demands will probably not be enough for your customer. Obviously, you have to analyse your total fuel consumption over and over again. In a typical long haulage transport in a fairly flat country (approx. 30 liters of fuel per 100 kilometers) less than ten percent of the fuel is used for actual mechanical work: acceleration, hill climbing!

So have a good look into your environmental losses.

What is the fuel consumption per tonnes goods and distance transported? What fuel quality is available? What transport logistic aids must be integrated into the tractor/truck ?

What has been done to reduce air drag and rolling resistance? What has been done to reduce losses from auxillary equipment e.g. leaking air hose connectors?

Are engine, gearbox and final gear the right choices for the specific transport application?

Is driver behaviour fuel saving or aggressive?

Stating that the fuel cycle has the highest ranking impact on the environmental life cycle assessment of truck transports is not equivalent to forgetting all other environmental impacts.

Noise, from cars and commercial vehicles, is certainly an environmental disturbance to many people in densely populated areas or people living close to highways. The truck industry has done a lot in a very short period of time in reducing the radiation of engine and exhaust noise. It is probably fair to say that today tyre/road interaction is the single most disturbing source.

In Europe, a directive regulating and decreasing tyre noise is on its way from the commission to the legislative parliament.

The use of **lubricants** needs special attention from the manufacturer and the user. As in most cases concerning design for environment, lower operating costs and lower impact are "hand-in-hand". Everybody are winners of a fill-for-life design, but reliable technology is not always readily developed and tested.

The **choice of materials** and **recyclability** has been very much stressed in the past. Not to be neglected but probably overstated in the overall life cycle assessment of a truck. Trucks (mostly iron atoms) are 80 to 90 percent recyclable in theory. But unlike cars, trucks are more seldom scrapped as entire units. Parts are replaced, engines are updated etc. The environmental impact of the chassis is very low in the final analyses, certainly in comparison with all the good transport work it has performed during its life!

All in all, **design for safety, health and environment** is and will be an important factor in the development of trucks and tractors. Now and then too speedy legislation or lack of knowledge may lead to increased transport costs but in the long run transport efficiency and environmental protection are converging interests.