

## Modern steam

*"All over the world there is a steam renaissance. Whilst this is at present limited to tourist trains, new generations are beginning to realise that steam can be used to run trains in a manner far different from the one often portrayed by the media. There are a number of reasons for this new attitude, as will be discussed in this paper. The present is an era of admirable "super-technologies" (which also include "super-expectancies"). There are however problems which these super-technologies cannot meet, and these may be decisive. Steam enthusiasts will be delighted to hear what follows in this paper. However, they must realize from the very beginning that the advent of XXIst Century Steam is not a comeback of the steam locomotives which they once loved. Instead it incorporates the most advanced level of modern engineering, even if the wheels are still round, the boiler is still used to evaporate water and a bunker is still used to carry the fuel."*

The above quote is taken from a paper on modern steam locomotives written by one of the worlds most respected engineering consultants on the subject. Ing Livio D. Porta. The link takes you to the complete paper for those interested. [XXIst Century Steam](#)

The tourist trains he refers to were built for the Swiss mountain railway system in the early 1990's. Only after the original steam locomotives had all been replaced by "Modern Diesel", the Swiss Railway realised most of their paying passengers were actually tourists there expressly for the purpose of riding the mountain steam trains. The modern steamers were built for the single purpose of recovering that tourist revenue. They were however built by engineers who took the opportunity to apply modern design techniques and sound thermodynamic analysis to the new engines - with the surprising result that they were found to be more powerful, more reliable and more economic to run than the diesels they themselves replaced.

A railway engine is not what we have in mind - but with a similar approach applied to a tractor a similar result emerges, and the only thing our tractor really has left in common with its steam tractor ancestor is the fact its wheels are round and it can burn almost any fuel.

The single most important factor when considering steam power is to realise that steam traction was never fully developed when it was finally replaced by the IC diesel and petrol engines of the day. Steam engines, and indeed its youthful competitors, were in fact all empirical designs that paid scant consideration to thermodynamics or ease of use - that did not really happen until the IC engined motor car became the mode of mass transportation we know it as today.

Ford and others chose the IC engine over steam for the simple reason almost anybody could learn the co-ordinated movements needed to handle a clutch, a gearbox and a throttle. Few could master the skill and knowledge required to constantly monitor boiler pressures and water levels needed for the steam car and few were prepared to wait the time it took to build up pressure. Those who continued to develop steam did come a long way in improving these shortcomings, but were too late to compete with what by then was the "technology lock" of the internal combustion engine and the "fuel lock" of petroleum.

Now that the ready availability and low cost of petroleum fuels are no longer taken for granted it becomes possible to reconsider steam traction in the light of what can happen if some of that development is applied to a vehicle that will happily use almost anything that burns as a fuel.

It is a subject we cannot cover in great detail on these pages - the links shown take you to papers and places that explain it much better than I can. The link below is an old advertising film that shows how far steam did get - and perhaps gives an indication of how far it could go with a combination of modern knowledge and design techniques - and third world costs.