

Tractors for Africa - made in Africa

Volvo T 22

The venerable Volvo T22 is still seen on many farms in Sweden. The Swedish equivalent to the Fordson and the Ferguson - a basic workhorse that just keeps on going. The old standby the farmer pats affectionately on the bonnet while explaining it has been "going strong for 50 years and will last another 50" .

All these tractors were made the same way - from grey iron castings which form a central backbone that houses the gearbox and the final drive. A fundamental industrial process.



One feature making this tractor suitable as a "design donor" is the outboard bull gear on the drive wheels. A modern steam powerplant has a flat torque curve from stationary to its full speed of about 1500 rpm in both directions - no gear change or reverse gear is required. That torque is substantially higher than the equivalent HP petrol or diesel, and well able to break things that are not substantial enough for the task.

The bull gears serve to keep the differential size manageable for the torque and the combined reduction of the diff/bull gears is about right for the engine to wheel reduction required. The elimination of the clutch and the gearbox, combined with the compact and lightweight engine, allows the use of almost identical front and rear drive assemblies when configured for 4-wheel drive centre steered.



Most would accept that tractors are a fundamentally important part of efficient agricultural production. Yet in Sub Saharan Africa, where people are heavily dependent on

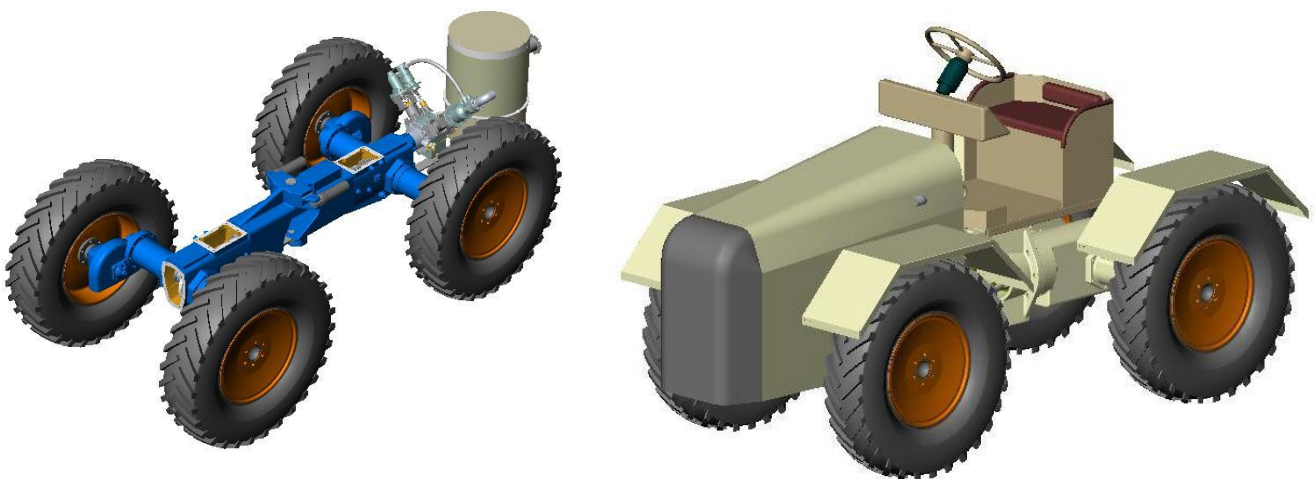
agriculture for their own survival, tractors are not yet common - land is mostly worked still with the use of animal or people power.

Tractor availability is limited to refurbished old western tractors and the cheapest made in the east. Availability is further severely limited by the lack of available finance to import any - and the inability to meet the most basic economic viability needed for any finance package.

The modern tractor is simply a too expensive a component to consider by any farmer caught in a poverty trap. A further very significant factor is the inability of the local farming community to maintain and support tractors - any attempt to donate tractors - or provide them as an aid package - would inevitably result in them becoming unserviceable or simply being sold on as an economic necessity.

In the case of the IFAF Biofuel plantation development - where the need for tractors runs into thousands - financing them would require many many millions of Euros in foreign capital debts - and many millions more to support and maintain them with an "island economy" of mechanics and spare parts etc. An undesirable distortion in the economy surrounding locally owned Biofuel Plantations.

The ideal solution is a tractor made and maintained in Africa itself - one that operates on biomass fuels - preferably the waste co-products from the plantations - or any such biomass fuel a farmer could get his hands on. One that is simple to operate - powerful enough to do the job - easily maintained by local technicians with its locally made spares - and above all inexpensive enough to be affordable by farmers and plantations, with the support of local financial institutions. Exactly as happened with western farming in the early part of the last century - when Henry Ford and others recognised the same needs.



When this Biodiesel project was first proposed - it seemed both obvious and relatively simple to implement. An assumption still seen in many similar projects being discussed and attempted and publicised on this medium.

Our proposed 500,000 Hectares is but a small percentage of the otherwise wasteland available and a small percentage of that likely to be utilised in the "Oil Rush" that has already started on the African continent.

It is though 5000 sq Km - the size of a small country!

It involves the planting and harvesting of more than 1 billion trees and the processing of 3 million tonnes of oil nuts every year. It will utilise a labour force of around 200,000 direct and about the same again indirect.

Broken down into 100 individual plantations and refineries it does become a little less difficult to conceptualise and to implement. Then we can imagine how to handle the movement of 2000 people around the plantation and the movement of around 80 tonnes of produce to the refinery - every day. All this over a now more manageable 50 square kilometres.

20 tractors running back and forth can move this amount of produce, another 20 can move this number of people, and maybe another 10 can move the utilities needed to feed and support the people and the plantation maintenance crews etc. Just 50 tractors per plantation burning a couple of tonnes of fuel a day between them, and 5000 tractors over the whole project.

All part of an "Oil Rush" that will ultimately demand maybe 100 times that many.

All part of a project that demands everything be "green" - that the fuel used should be Biomass co-product - not the refineries own Biodiesel or shipped in Petrodiesel.

So the Tractor needs to meet the following specifications.

- Able to burn Biomass - preferably in the form of pellets or glycerine.
- Four wheel drive and relatively low wheel loading to deal with the soil type.
- Easy to drive and easy to maintain with local labour.
- Able to function as a trailer puller, plough, fork lift, front loader and digger.
- To avoid the economic distortion promised by the import and maintenance of "western" tractors, it should be able to be manufactured using available raw materials and labour.
- And of course - it must look and be "modern"

After a stunned silence listening to this, the design team leaders first comment was "Have you considered a steam powered Volvo T22"?

Some of us are old enough to remember "traction engines" in fairgrounds or as road rollers - and those were the last steam tractors built. Big old boilers on steel wheels with smokestacks and coal boxes. Terrifying things that could explode if neglected or not tended correctly.

This is not about that though - it is about a whole "new" steam age. It is about development done in the last days of the age of the steam automobile, and again in the 1970's when the first "oil shock" forced people to consider alternatives. It turned out there was no demand then - oil supplies stabilised and prices were adjusted to. Now - a generation later - we do have to consider alternatives.