



# Farming Connect Management Exchange

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Austria

Timber Extraction by Cable Crane

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## 1. Background

Woodland management on farms and small estates in Wales (representing about half of the forest and woodland cover in Wales) has been in decline for at least 100 years. Recently, woodland management has had a revival, both through Government incentives and woodland owners' upsurge of interest, to produce woodfuel, enhance farm incomes, increase biodiversity and mitigate against climate change.

Much of the timber that can be produced to enable the woodlands to be managed back into good and sustainable health needs to be extracted on steep slopes or across sensitive sites. To avoid ground damage and safety of operations, cable cranes using line winches are, historically, a tried and tested method of working.

Timber extraction on steep ground by cable crane in Wales is dominated by large machines, usually based on 360° excavators. These require a large volume of timber harvested at any one time to justify the huge outlay in machines, operators and movement from site to site. This means such operations are confined to large commercial operations and are not suited to smaller woodlands often with poor infrastructure for access both between and within the woodlands. A very few medium-scale units for uphill and downhill extraction are still available in Wales and are owned by specialist woodland contractors; typically, the machines are at least 30 years old and are tractor-driven but are only locally available and no longer manufactured which means fewer are available each year that goes by. There are a few machines manufactured in Czech Republic, Austria and Germany but they are expensive and not imported into the UK.

Smaller-scale tractor-driven units are available new from several manufacturers in Austria and Slovenia, but again they are expensive to purchase from dealers, require higher horsepower tractors and are for uphill extraction only (using gravity to return the carriage, having only two cables - a fixed skyline and a haul-in line).

In order to have the opportunity to extract timber uphill, downhill or level on a farm scale using much lighter and more versatile tractor-driven unit, we developed a small-scale cable crane in 2016 by restoring an old double drum winch mounted on a 50 HP tractor. This has proved ideal for small operations extracting up to 100 metres by either using a 'hi-lead' system, i.e., two cables with timber lifted at one end, or on a fixed skyline (tensioned using a hand-operated winch to fully raise the timber).

The problem has now arisen in that quite a lot of interest has been shown in this machine, but the small winches required are not manufactured now and are only available in limited numbers as second-hand or scrap items for restoration. However, a few contractors have retained their old winches, which are often still attached to an old Ford 'County' tractor, but these base machines are rapidly becoming sought-after collectibles. In addition, the lighter-weight, simpler carriages required to complement the smaller-scale winches, commonplace 20 or 30 years ago, are only available from European manufacturers and are expensive to import. The modern complex equivalents used for larger commercial operations are heavier and prohibitively expensive for small-scale, intermittent work.

The aim of the visit was to investigate, from personal contact we had previously with personnel from a Forestry Training Institute in Austria, what alternative methods were currently available in Europe that were different to those currently imported into the UK. The objectives were, in addition, to have a further look at equipment that had been developed by two other firms to solve the problem of small-scale operations that are not being fully catered for by 'mainstream' manufacturers.

## 2. Itinerary

### **Day 1.**

Visit to 'Hafo GmbH' - a small company which manufactures lightweight auxiliary winches for timber work and is based near Steyr in Central Austria ([www.hafo.co.at](http://www.hafo.co.at)):

'Hafo' is a farm-based enterprise run by the four Haselsteiner brothers, who between them have considerable forestry and engineering experience and expertise.

The company had set up two demonstrations for us; the first in a steep forest area extracting felled spruce in a selective thinning operation using a conventional tractor with a Forestry single drum 3-point linkage mounted timber winch ('Tiger Seilwinden').

The auxiliary winch ('Hilfswinde') fitted to the tractor winch carries a High Modulus Polyethylene (HMPE) 'straw-line' rope that is weight-for-weight stronger than steel and extremely lightweight. The purpose of a 'straw-line' is to pull a heavier winch cable out from the main winch rather than pulling out a cable by hand, especially uphill which is a particularly arduous task.

The 'straw-line' is attached with a strop to the operator's waist who then climbs the hill to the timber and attaches a pulley block to an anchor tree or stump. The end of the 'straw-line' is

returned to the main winch and attached to the cable, which is then drawn up by remote control to operate the auxiliary winch to pull out the main cable on the timber. The demonstration showed how a heavy (and unwelcome) task is made very simple using basic technology. All that is required from the tractor is hydraulic and electrical connections to operate the auxiliary winch. The second demonstration was held at the small factory unit on the Haselsteiner farm where the winches are assembled.

We were shown the stock of spares and complete winches at the depot, together with the sequence of development and quality control carried out to the winches to meet various European Standards, including the required 'CE' certification and the prestigious 'KwF' Standard required for the German Forestry market.

The practical demonstration showed how to operate a 'Sapiwinde' - a portable winch using the same technology as the auxiliary winch, but fully portable for multiple applications, using unique quick-change brackets to attach the winch to, for instance, a forestry crane, to extend the reach on awkward sites. We were impressed by the simplicity of the attachment point and the fact that the same winch could be used on a range of machines; again, all that is required are electrical and hydraulic connections.



*The auxiliary winch, fitted to a tractor-mounted timber winch, used for pulling the main winchline uphill.*

## **Day 2.**

Visit to BFW Forstliche Ausbildungsstätte (Forestry Training Institute) in Ossiach, Southern Austria. The college specialises, among many other forestry disciplines, in the use of cable cranes for timber extraction. A tour of the superb facilities of the college included the accommodation and refectory (where we stayed and dined), equipment stores, offices and teaching rooms; the forest industry is taken seriously in Austria.

In the workshop, we viewed in some detail an impressive range of equipment ranging from very simple mechanical systems to highly complex self-driven units. This was an excellent illustration

of the progressive development of the winches and carriages that had evolved in Austria and a unique opportunity to see the working mechanisms of the machines!

The first practical demonstration in the forest consisted of a Unimog driving an Austrian 'Kohler' 3-point linkage mounted lattice-tower skyline using simple technology based on an Igländ double drum winch head. Pole-length timber was extracted uphill from a steep slope with a 'Kohler' gravity-return locking carriage. The second demonstration was a lorry-based Konrad 'Mounty' combination skyline mast and processor used for extracting whole trees. The winch brought timber uphill quickly - the Konrad carriage returning under gravity. The system is highly efficient, versatile and mobile, but this comes at a cost; the whole unit being expensive to purchase but cost-effective for full-time use.

The third stop in the forest was a static demonstration of a Konrad 'Woodliner'. This is a self-propelled skyline carriage that is used primarily for downhill or horizontal timber extraction. A fixed skyline cable, tensioned with an anchored winch, had been set up to show how the carriage uses its own engine to wind itself back up the skyline. The timber is lifted off the ground with the integrated carriage winch, and then the carriage is hauled in with a third winch, such as the one on the 'Mounty' cable crane, further enhancing the versatility of the system.



*A medium-scale cable crane with tower and locking skyline carriage.*

### **Day 3.**

Visit to Herr Dietmar Raith and family, near Graz in central Austria - a private forest operator with a self-built small-scale trailed cable crane unit with a folding mast. A video posted on 'YouTube' inspired our request to visit this installation. As explained in the background introduction above, there are no small-scale units being manufactured in Europe (as far as our research has revealed). Herr Raith has solved the problem for his woodfuel timber extraction by

building his own machine using a combination of second-hand winch parts, high quality engineering and innovative design to create a light and versatile unit.

Herr Raith and his sons had set up the cable crane to extract 4 metre woodfuel logs from a small forest thinning, driven by a 50 HP tractor. The skyline was set up for uphill extraction using a unique self-built carriage that self-draws the timber to the carriage and stays in place without a separate locking mechanism. The evolution of the machine was explained, from early prototype to the current machine, including add-on units to enable the carriage to be locked for downhill extraction. In all, a valuable and inspiring visit showing how lateral thinking and good design can be used to advantage to create a small but versatile machine at quite low cost in a small workshop.



*Small-scale self-built cable crane unit used for firewood extraction.*

### 3. Next Steps

There were at least another six cable crane manufacturers close by in Austria and Slovenia who we would have visited on our exchange visit if time had permitted, so a further visit to Austria is planned: The quadrennial Forest Machine Exhibition, 'Austroforma' is being held near Vienna in October 2019. This is an opportunity to further expand on knowledge and experience of the cable cranes available, as a wide range of manufacturers will be demonstrating machines.

From the knowledge gained on the current trip, the plan is to build, or have manufactured, up to date but versatile cable crane units capable of extracting timber uphill, downhill and horizontally, to facilitate small-scale, intermittent timber extraction on steep, inaccessible or sensitive sites in Wales.

Further detailed investigation to help the design of control systems (manual, automatic or electro-hydraulic) to complement the engineering required to build the machines is also required, together with more insight into the implications of the European Machinery Directive

and the associated PUWER and LOLER legislation in the UK on the production and use of new machinery.

#### 4. Key messages to the industry

1. Timber production from farm woodland or other areas of woodland on a small-scale, intermittent basis using cable cranes is viable if appropriate machines are used.
2. The cable cranes need to be capable of being moved, erected and dismantled simply and quickly, driven (mounted or trailed) by a standard farm tractor, need to be capable of uphill, downhill and horizontal extraction and must not be over-expensive.
3. Harvesting timber from farm woodland is appropriate in the landscape, is compatible with environmental constraints and provides a flow of the timber production locally if carried out 'little and often'.
4. Larger volumes of similar grades of timber for lorry haulage to end users or processors can be amalgamated from numerous small areas in localised grading yards ready for processing or onward movement.



*Typical landscape in Central Austria showing integration of farming and forestry with small-scale (< 2ha) felling coupes and timber extracted by cable cranes.*



*Lorry haulage from multiple cable crane extraction sites dropping timber in grading yard.*



*Extracted and graded timber is chipped and utilised to heat the Forestry Training Institute.*

**Chris Hughes May 2019**