

The UK forestry sector traditionally refer to the nominal working scale of plant and equipment by size. The working scale indicated by plant and equipment size is as follows:

Description by machine weight	Large	Medium		Small
	>12t	9t – 12t	5t – 9t	3t – 6t
Harvester	Wheeled frame steered purpose built or purpose – built / modified excavator (can include self-levelling base).	Wheeled frame steered purpose built or purpose – built / modified excavator.	Wheeled frame steered purpose built or purpose – built / modified excavator.	Agricultural tractor or frame steered purpose built + felling / shear head.
Guide to tree diameter	Approx. 0.7m	Approx. 0.6m	Approx. 0.5m	Approx. 0.3m
Harvester head	Disc saw or chain saw – with accumulator.	Disc saw, chain saw or shear– with accumulator		Chain saw or shear
Forwarder	15t – 20t payload.	10t – 15t payload.	6t – 10t payload.	3t – 6t payload.
	Purpose built - wheeled frame steered.	Purpose built - wheeled frame steered + agricultural tractor.		Purpose built - wheeled frame steered.
Description of machine	Mini System			
Type	Mini Forwarder: Wheel frame steered purpose-built unit.	Compact Tractors and Forwarding Trailer: 4 x wheeled tractor either frame or standard steered.	ATVs: Wheeled unit & trailer / traileed system.	Pedestrian controlled: Wheeled / Tracked driven unit.
Load capacity	<2.5t	<2.5t	Based on manufacturers towing capacity	1t – 1.5t

The features of the plant and accessories to be considered for use must include:

- proposed working method
- levels of operator protection required on the plant:
  - operator protective structures (OPS) – in the form of guarding (e.g. bars/mesh/polycarbonate glazing), to prevent harvesting residues etc entering cabs
  - falling object protective structures (FOPS) – in the form of a frame/deflectors surrounding cabs to prevent falling objects striking and entering cabs
  - roll-over protective structures (ROPS) – where there is a risk of the plant overturning
- stability and floatation – track length and width
- ground clearance – raised undercarriage
- machine guarding – to prevent damage to services / pipework / components during the operation

- poor light conditions – adequate lighting must be fitted.

Information on the above will help in ensuring suitable plant is selected. The following list provides guidance on the plant that is currently the most regularly used on Balfour Beatty projects when undertaking Vegetation and Tree Clearance activities:

System	Site Capability	Crop / Products Capability	Safety Limitations	Operation
Forwarders	<p>Gentle to moderate slopes 30 – 50%.</p> <p>Defined tracks – reducing slide slope.</p> <p>Low to moderate size and density of obstacles.</p> <p>Moderate extraction distance - &lt;450m.</p>	<p>Small trees from first thin operation.</p> <p>Second thin (trees <math>\geq 0.10\text{m}^3</math>). Small roundwood and logs up to 5.0m.</p> <p>Continuous Cover Forestry (CCF), Alternative to Clearfell (ATV),</p> <p>Alternative to Clearfell (ATV), PAWS and standard forest conditions.</p>	<p>ROPS, FOPS, OPS variable dependant on manufacturer's data.</p> <p>Advised to check specification against FISA guidance.</p> <p>Load capacity range 2t - 6t.</p>	<p>Sit in operation. Controls for loader in the cab</p> <p>Trailer &amp; 4x4 / tractor to transport.</p>
Harvesters	<p>Gentle to moderate slopes 30 – 50%.</p> <p>Defined tracks – reducing slide slope.</p> <p>Low to moderate size and density of obstacles.</p> <p>Moderate extraction distance - &lt;450m.</p>	<p>Small trees from first thin operation.</p> <p>Second thin (trees <math>\geq 0.10</math> to <math>0.30\text{m}^3</math>).</p> <p>Small roundwood and short pole lengths.</p> <p>CCF, ATC, PAWS and standard forest conditions.</p>	<p>ROPS, FOPS, OPS very variable dependant on manufacturer's data.</p> <p>Advised to check specification against FISA guidance.</p>	<p>Sit in operation. Controls for loader in the cab.</p> <p>6-or-8-wheel drive.</p> <p>Trailer &amp; 4x4 / tractor to transport.</p>
Skidders	<p>Gentle to moderate slopes 30 – 50%.</p> <p>Defined tracks – reducing slide slope.</p>	<p>Small trees from first to second thin (trees <math>\geq 0.10</math> to <math>0.30\text{m}^3</math>).</p>	<p>ROPS, FOPS, OPS variable dependant on manufacturer's data; usually steel mesh at the rear.</p>	<p>Sit in operation, frame steered.</p> <p>Option of radio control winch actuation.</p>

	<p>Low to moderate size and density of obstacles.</p> <p>Moderate extraction distance - &lt;450m.</p>	<p>Short pole lengths.</p> <p>CCF, ATC, PAWS and standard forest conditions.</p>	<p>Standard glazing at front (needs to be changed if Polycarbonate).</p> <p>Advised to check specification against FISA guidance.</p>	<p>Trailer &amp; 4x4 / tractor to transport.</p>
Tractors	<p>Gentle to moderate slopes 30 – 50%.</p> <p>Defined tracks – reducing slide slope.</p> <p>Low size and density of obstacles.</p> <p>Moderate extraction distance - &lt;450m.</p>	<p>Small trees from first and possible second thin operation (trees &lt;0.10m<sup>3</sup>).</p> <p>Small roundwood and short pole lengths.</p> <p>Including CCF, and ATV operating conditions.</p>	<p>ROPS – either Arch-Bar type or Cab structure.</p> <p>FOPS or OPS - check manufacturer's data.</p> <p>Needs to have Polycarbonate / safety glazing if cab is fitted.</p>	<p>Sit in or Sit on operation.</p> <p>Manual loading of trailer / ancillary equipment.</p> <p>On hydraulic systems operation could be from seat, side of trailer unit or tractor.</p>
Forwarders	<p>Gentle slopes &lt;30%.</p> <p>Defined tracks – reducing slide slope.</p> <p>Low size and density of obstacles.</p> <p>Short extraction distance 200m to 250m.</p>	<p>Small trees from first thin and second thin operations (trees &lt;0.10m<sup>3</sup>).</p> <p>Small roundwood and short pole lengths up to 3.7m.</p> <p>Including CCF, ATV, PAWS and standard forest thinning, and small tree clear-fell conditions.</p>	<p>ROPS, FOPS, OPS very variable dependant on manufacturer's data.</p> <p>Advised to check specification against FISA guidance.</p> <p>Load capacity range 1.5t - 3t.</p>	<p>Sit in operation. Controls for loader in the cab.</p> <p>6-or-8-wheel drive.</p> <p>Car or 4x4 &amp; trailer to transport.</p>

<p>Trailers</p>	<p>Gentle slopes &lt;30%.</p> <p>Defined tracks – reducing slide slope.</p> <p>Low size and density of obstacles.</p> <p>Short extraction distance 200 to 250m.</p>	<p>Small trees from first thin and second thin operations (trees &lt;0.10m<sup>3</sup>).</p> <p>Small roundwood and short pole lengths up to 3.7m.</p> <p>Including CCF, and ATV operations.</p>	<p>No ROPS, FOPS, OPS on the trailer.</p> <p>Operators protection may not be on the prime mover – checks must be carried out on this prior to use.</p> <p>Prime mover must have adequate power.</p> <p>Risk assessment must include FOPS/OPS of the operators working position especially with hydraulic loader.</p> <p>Low load capacity.</p> <p>Variable towing capacity.</p> <p>Variable tongue / ball hitch capacity.</p> <p>Ancillary equipment must be to manufacturers specification.</p>	<p>Sit on controls (ATC – Mini Tractor).</p> <p>Manual loading of trailer / ancillary equipment.</p> <p>On hydraulic systems operation from seat, side of trailer unit.</p> <p>Car or 4x4 &amp; trailer to transport.</p>
<p>ATVs</p>	<p>Gentle slopes &lt;25%.</p> <p>Defined tracks – reducing slide slope.</p> <p>Low size and density of obstacles.</p> <p>Short extraction distance &lt;200m.</p>	<p>Small trees from first thin and second thin operations (trees &lt;0.10m<sup>3</sup>).</p> <p>Small roundwood and short pole lengths up to 3.7m.</p> <p>Including CCF, and ATV operations.</p>	<p>No ROPS, FOPS or OPS.</p> <p>Exposure to elements and overhead crop conditions.</p> <p>Risk assessment must include FOPS/OPS of the operators working position especially if used with a trailer &amp; hydraulic loader.</p>	<p>Sit on controls (ATC – Mini Tractor).</p> <p>Manual loading of trailer / ancillary equipment.</p> <p>On hydraulic systems operation from seat, side of trailer unit.</p>

		<p>Low load capacity (0.25t to 0.5t including trailed unit).</p> <p>Low towing capacity.</p> <p>Low tongue / ball hitch weight, affected by terrain.</p> <p>Ancillary equipment must be to manufacturers specification.</p>	<p>Car or 4x4 &amp; trailer to transport.</p>
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*NB: The above slope percentages, load capacities, extraction distances are indicative and the manufacturers operating manual for the specific item of plant must be checked to determine plant-specific figures.*