Rigging with the Port-a-Wrap

The Port-a-Wrap is the most commonly used friction device for rigging in the arboricultural industry in New Zealand. The original Port-a-Wrap was designed by Scott Prophett and Norm Hall but many manufacturers have now developed their own design. All of these Port-a-Wraps are based on the same principal - a central pipe that we wrap the rope around to create friction, allowing the user to control the load being rigged.

There is a variety of designs to choose from when looking into buying a new Port-a-Wrap and all of them have pros and cons. This article will not compare the products; instead we will concentrate on the general use of all Port-a-Wraps.

Technical specifications

All quality Port-a-Wraps will be delivered with a user manual that will show the technical specifications. It is wise to refer to this manual before buying the necessary attachment slings. In New Zealand we work with a 10/1 safety factor for all gear used in arboricultural rigging. Be aware that most products sold only refer to safe working load (SWL) or working load limit (WLL). This SWL is often calculated with a different safety factor then the 10/1 that we use in arboriculture. It is best to refer to the minimum breaking strength of the product and calculate your own SWL.

Minimum breaking strength / 10 = SWL for arboricultural rigging

Attaching the Port-a-Wrap at the base of a tree

There are so many ways to attach a Port-a-Wrap to the base of the tree that I will not refer to them. The method described below is an efficient and simple way to minimise the room for error and to maximise the productivity of the rigging operation.

The Port-a-Wrap is best set in hip height of the operator. To do this we tie an accessory cord in breast height to the tree using a cow hitch. The accessory cord should be of about 6m lengths with a spliced or tied eye in the end allowing for a karabiner to be attached. You can hang the Port-a-Wrap off this karabiner. It is best to use a screw-gate karabiner for this connection. All other karabiners show disadvantages for this application. Once the Port-a-Wrap is positioned it is easy to attach the load bearing sling.

For the bottom load bearing sling we recommend a dead eye sling that can be choked off to the bottom connection point. If a dead eye sling is not available a short piece of rope (6m) with a large bowline loop can also be used. This removes all connectors out of the load bearing system. After the sling is connected to the Port-a-Wrap it can be tied to the tree with a cow hitch.

Rigging with the Port-a-Wrap

Picture 1

We prefer the described method of attachment to all others because the Port-a-Wrap has a top and bottom attachment. The top and bottom as well as the cow hitch attachment prevent the Port-a-Wrap from working itself loose. Through using the accessory cord to set up the Port-a-Wrap it is easier to get all slack out of the anchor system. The less movement we have at our lowering device the more control we have over the load. Controlling the load will allow us to better control the forces generated while rigging.

Cow Hitch:

Rigging with the Port-a-Wrap

Belaying the Port-a-Wrap

Before belaying the port-a-wrap it is important to make sure the rope in use will work properly with the Port-a-Wrap you have. The Buckingham Port-a-Wrap can be used with a 3/1 bend ratio, allowing the rope diameter being a third of the pipe's diameter.

Pipe diameter / 3 = maximum rope diameter

When using ropes with a greater diameter there is the danger of the rope not running freely and so creating shock loading forces in the rigging system. I have experienced that using a larger bent ratio helps reducing the accidental shock loading. As in all technical rigging it is best to use ropes that keep their round shape under load.[1]

When belaying the Port-a-Wrap it is important to wrap the rope around the central pipe in a way that prevents sharp turns (see picture 2). This means you always have to finish the first full turn around the central pipe. It is good practice to pre-tension the rigging rope before the cutter in the tree releases the load. To do this we belay the Port-a-Wrap with one wrap, pull down the working end of the rope and at the same time collect the slack out of the standing part of the rope (see picture 3).

[1] *For more information on ropes please read the article The Myth Of Rigging Ropes (Tree Matters, 2010, 12/1) Download: http://proclimb.co.nz/wp-content/uploads/The-Myth-of-Rigging-Ropes.pdf*

Rigging with the Port-a-Wrap

Picture 2

Picture 3

In rigging systems with a long length of rope or where we need to get all stretch out of the rigging system, we can tie a prussic to the working end of the rigging rope and connect a pulley (see picture 4). Then we belay the Port-a-Wrap with one or two wraps and guide the standing part of the rope through the pulley. This way we have created a three to one mechanical advantage to pre-tension the rigging rope.

Picture 4

Once we have tightened the rigging rope we can tie it off to the Port-a-Wrap and remove the prussic and pulley. Before the cutter releases the load we now need to untie the rope so we can dynamically control the load. This means we let the rope run with the load and use all of the space between the last redirecting point of the rope and the object to protect to slow down our load to a stop.

Rigging with the Port-a-Wrap

Attaching the Port-A-Wrap to a tree

1. The Port-A-Wrap should be attached to the tree with a piece of rope or a sling that is strong enough to withstand the generated forces of the rigging operation. When using a dead eye sling or a short piece of rope to attach the Port-A-Wrap to the tree we recommend using the cow hitch.
2. The Port-a-Wrap should be tied to the tree in hip height.
3. The Port-a-Wrap should be set tight against the tree to allow for a fast and efficient loading of the Port-a-Wrap and pre-tensioning of the rigging rope.
4. Using a top strop to position the Port-a-Wrap is recommended.

Lowering a load with a Port-A-Wrap:

1. The Port-a-Wrap should only be used with a sufficient safety factor.
2. All lowering of loads is done by the ground workers (not the climber in the tree).
3. Before lowering a load the ground worker should look for good footing and assure the rope can run freely through the Port-a-Wrap.
4. The ground worker who is lowering the load with the rope should wear leather gloves to prevent rope burn to the hands.
5. All loads are to be lowered dynamically to minimise shock loading of the tree.
   This means we let the rope run with the load and use all of the space between the last redirecting point of the rope and the object to protect to slow down our load to a stop.
6. The ground worker on the rigging rope should leave at least 3 metres of rope between him and the Port-a-Wrap.
7. Never wrap the lowering rope around body parts.

References:

- http://www.treeworld.info/f18/portawrap-inventor-381.html
- Don Blair's Arborist's Equipment Page 197-198
- Buckingham user manual