TIMBER FIRE LOOKOUT TOWERS IN WESTERN AUSTRALIA

By Gordon Styles

In this brief article I will attempt to broadly describe the site location and construction methods used to erect the 110 to 140 foot timber fire lookouts during late 1930's to 1950 (*Fig. 1*).

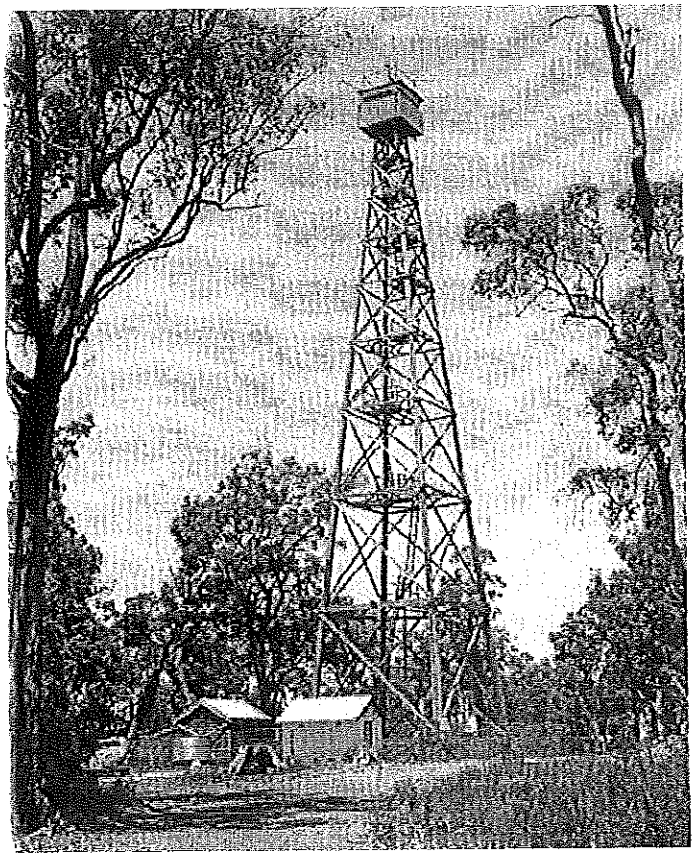

Fig 1: 110 foot fire lookout

Some fourteen (14) of this tower class were built in the Central and Southern jarrah forest areas. Here the landform is gently undulating with forest canopy of up to 150 feet.

I rely on memory, some experience, but mainly my good fortune as a young forest trainee to associate and work with some of the great men that built these towers. They were referred to as "Jacks of all Trades" paid only as "Bush Carpenters" but in reality were Engineers of the highest degree.

Although having been "metricated" for over 30 years I find it more fitting to use the old "inches and feet" when discussing these majestic structures. The majority of the towers are standing today with some still providing a vital role in the fire detection system.

Locating suitable tower sites on gently undulating terrain covered with high canopy forest and often dense understorey was not a simple task. The height variation between high and low ground in most cases is only fifty to one hundred and fifty feet. Foresters of the day never had the luxury of aerial photographs or contour maps to aid the search for suitable sites. They were trained to keep a watchful eye for any

higher than normal ground that may give a view over the surrounding area for perhaps ten to twenty miles.

Once a site was located the next step was to prove its potential. The tallest possible tree on the high ground was "rough pegged" to climb and establish the "area seen" and the height of tower that would be required.

The key to erecting a tall tower was the availability of a suitable "lead tree". This required a fairly large 10-12 foot girth, tall, reasonably straight and healthy tree immediately adjacent to the proposed site. It was essential that the tree could be felled without fear of damage to the tower when construction was completed.

Access to and clearing of the site was carried out by hand with the aid of a trusty horse.
The four main legs were selected jarrah piles cut from the surrounding forest. Depending on availability each leg would be made up of three or four lengths ranging from 30 to 60 feet. Piles were heart in taper hewn using a "broad axe". Base size of 18ins to 24ins square (dependent on tower height) tapering to 8ins square at the top.

Main structural timbers used were high quality sawn jarrah. Sizes ranged from 25 foot 18ins x 6ins beams for lower walings to 6ins x 4ins for upper diagonal bracing. All components are bolted with heavy galvanised bolts.

The "lead tree" was pegged to allow fixing of pulley blocks (Fig. 2) in preparation for the "big lift". The main lifting block was usually located at 3/5th the tower height with lesser blocks above and below that point.

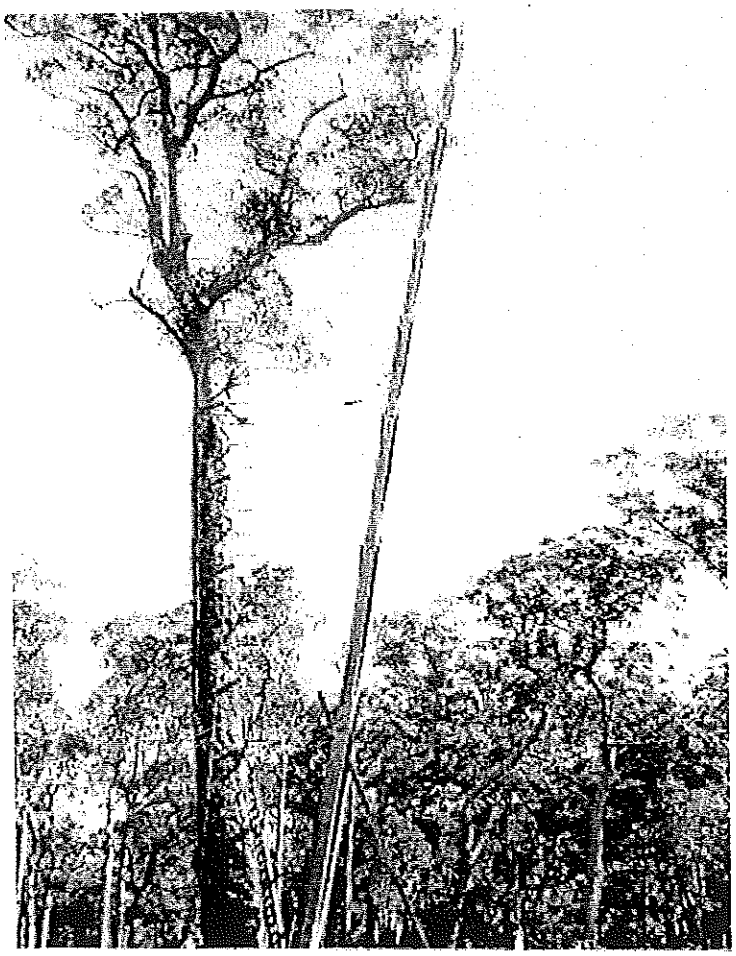

Fig 2: A suitable "lead tree" used in construction of the 140 ft Glenoran Tower

The next stage is to dig the four footing holes. This often required blasting through cap rock to achieve the minimum of 4 ft x 4 ft x 6 ft deep cavity. Reinforcement made from steel railway line were fixed in place with all footings interconnected by a single length of rail line below ground level. Above ground form boxes approximately 3 ft x 3 ft x 9 ins high were placed on top of the footing holes to form the final resting position of the tower legs. When standing, each tower leg is fixed to the footing by bolting through four steel anchor plates 3 in x 1 in x 6 ft long set 3 feet into the concrete. This work had to be completed several weeks ahead of the main lifting stage to ensure concrete was set.

A bed of small timbers is layed out on the cleared site to allow construction of the tower proper to begin. The taper squared sections that will make up the two rear legs, (ie; furthermost from the lead tree) are moved in and joined to make up the full length required. This is done by 2 foot half lap joins spliced together with four 4 foot x 3 ins x ½ ins bolted plates. Joins must not coincide with walings and braces.

Base of rear legs are placed near their concrete footings. Once exact measurements and alignments are made walings and diagonal braces can be drilled and bolted according to plan. As this is the rear section, these timbers must be fixed on the underside of the legs. Once measurement and alignments are rechecked, all joints are now marked and the section dismantled with timbers carefully stacked ready for re-assembly.

Now turn the LH rear leg inwards 90°. Move the RH rear leg outwards several feet to allow room and now make up a new leg which will be the LH front leg. Measure, align, drill and bolt walings and braces according to plan. Check, mark joins, dismantle and stack ready for reassembly.

Now move LH front leg right across to just outside the left side work area. Turn the RH rear leg inwards 90°. Make up the final or RH front leg in the left side working area. Measure, align, drill, bolt, recheck, dismantle and stack ready for reassembly.

Now move RH front leg over to the right hand working side. Turn both the RH front and LH front legs outward 90°. Move both front legs forward onto their respective concrete footings with base of legs against and inside the already established anchor plates. Measure, align then fit walings and diagonal braces, drill and bolt firmly after measurements and alignment are rechecked. This side is now ready for lifting.

The location of the pulley block on the "lead tree" and the fixing of ropes to the section being lifted is absolutely essential. All must be checked and rechecked.

The main lifting power was usually an old 25 cwt truck overladen with rocks to prevent wheel spin during the critical lift stage. Once the lift started there was no turning back. The mechanical brakes on these vehicles were not good enough (if they worked at all) to allow a section to be lowered. Chocks were placed behind the rear wheels as the lift progressed. There were many other handheld guide ropes and hand winches involved in the lift. All was usually well coordinated by much yelling and cursing from the Overseer in Charge.

Once the front section was in its near vertical position, it would be tied off and anchored to the lead tree. (Fig: 3)

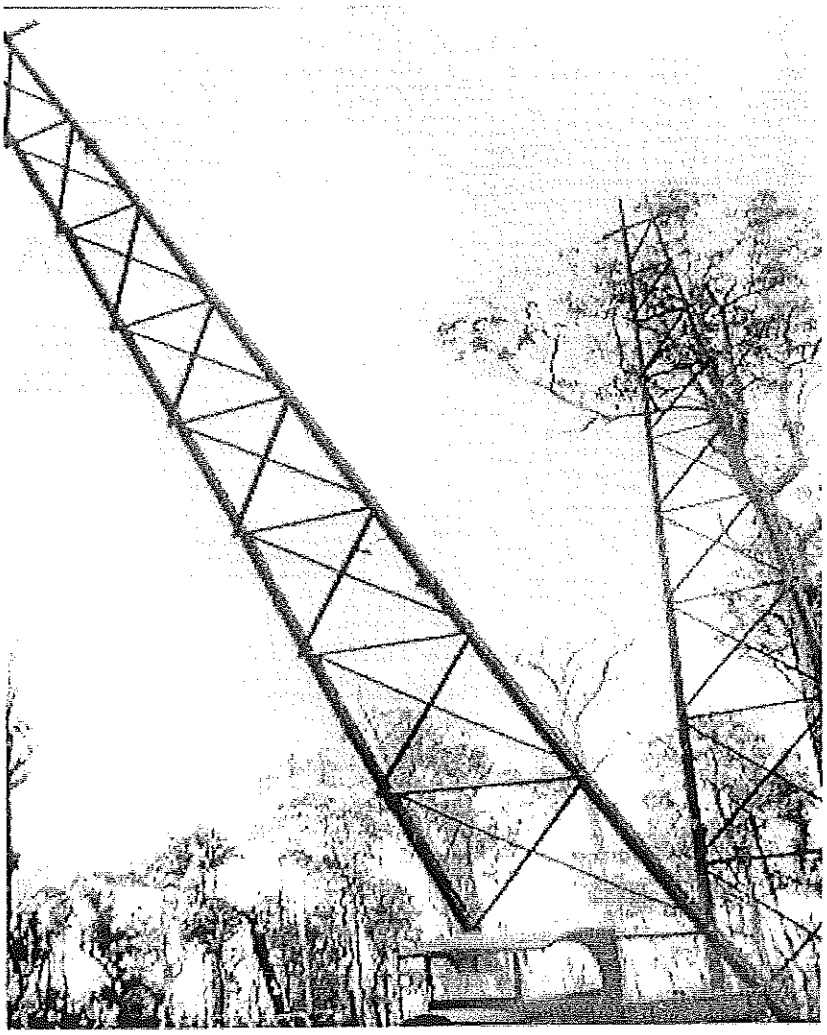

Fig. 3: Front section anchored to "lead tree". Rear section midway through lift.
Note old vehicle used in foreground

The rear section legs are turned out 90° to the first assembly position and moved back into place with the base sitting on respective concrete footing. Anchor plates are placed in the forward and side holes left by the removal of the internal form box. Wooden wedges are used to hold anchors firm during the lift. The rear section is now reassembled (walings and braces on the underside).

Lifting procedure is the same as for the front. It was necessary to remove one waling from the front side (see figure 4) to allow rope movement.

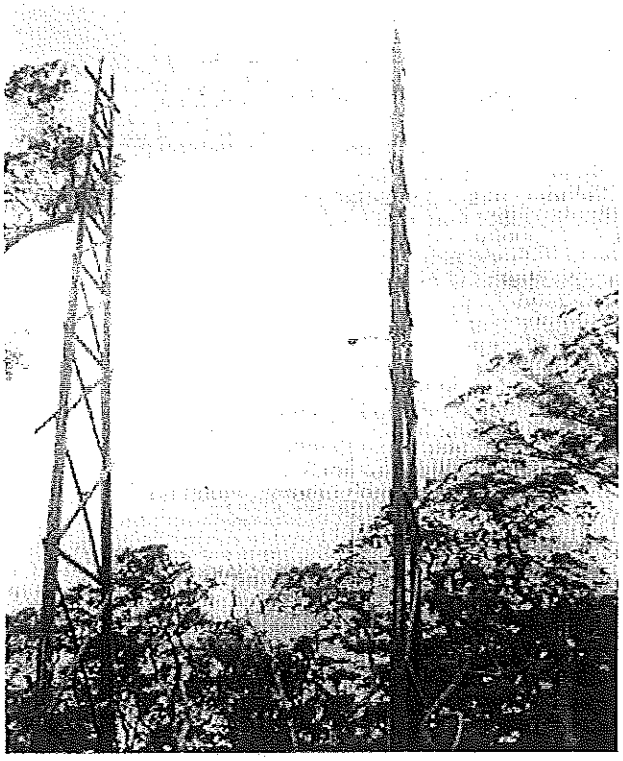

Fig 4: Second lift near complete. Note waling removed in front section

Once this side is up, near position and anchored the base may need minor adjustment using crowbars and large sledge hammer. The lower side walings are bolted in position.

It was now a matter of reassembling the sides.

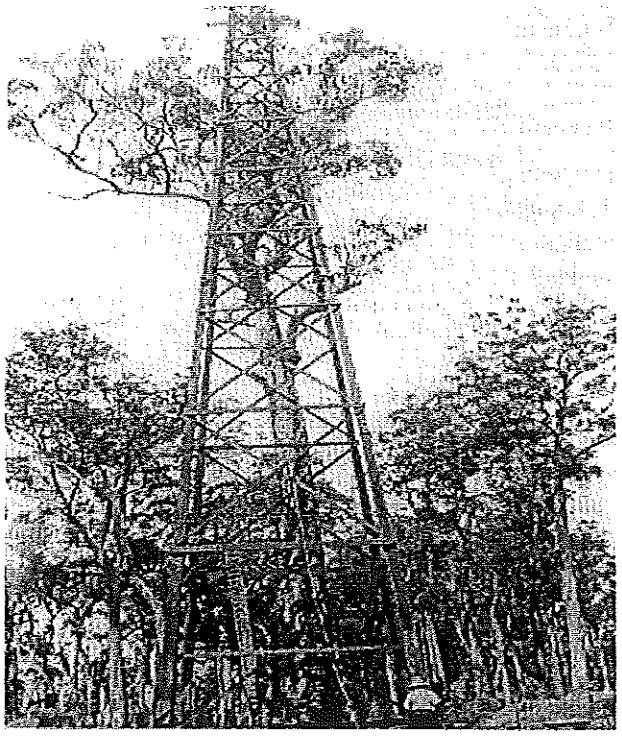

Fig 5: Front and rear section in position ready for side timbers to be reassembled

Various methods were used. Some preferred to reassemble from the bottom up. The more adventurous would climb up via the lead tree or diagonal braces, fixing pulley blocks at the top and reassemble from the top down.

Once the main structure was firmly braced, remaining anchor plates were bolted to legs and cemented in. All guy ropes were removed. Internal bracing, platforms, ladders and finally the cabin were fitted.

Last but not least the "lead tree" must be felled. This was done by those with felling experience and always with the wind blowing in the right direction.

It was then a case of stand back, admire the good work, gather up the tools and then back to those other routine forest duties.