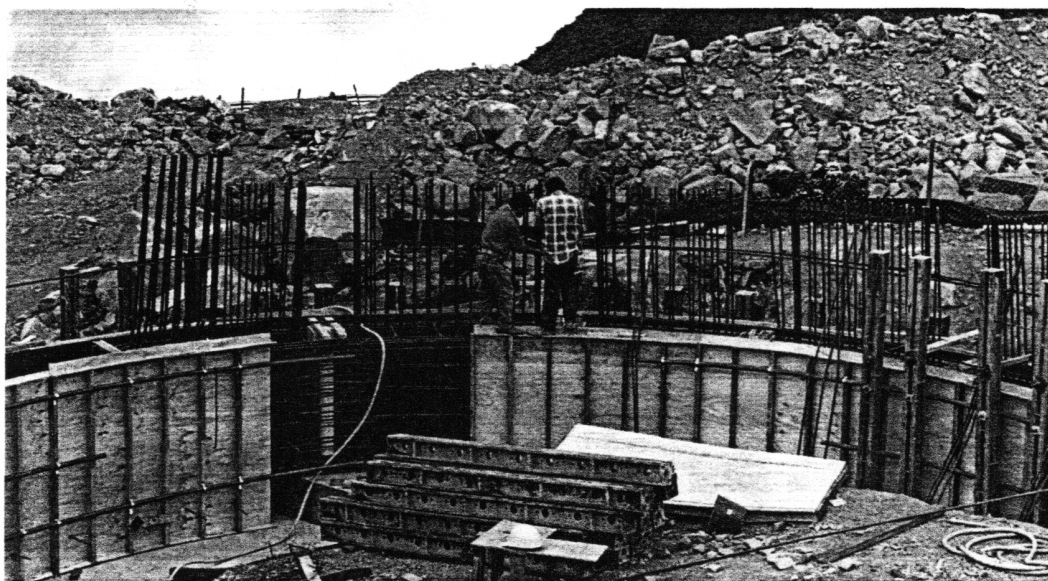
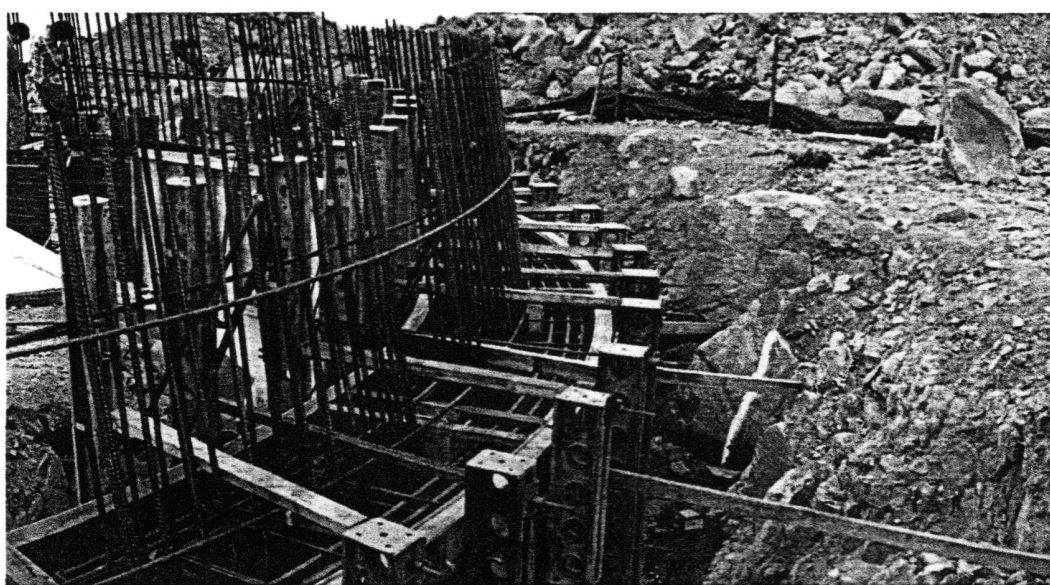


UNIQUE BROADCAST



Setting reinforcement in position.



Close up view of reinforcement and ring beam formwork.



Formwork and reinforcement set up prior to pouring foundation ring beam.

As part of equalisation in T
ing tower is being constructed
on Mt Wellington, overlooking
replace the existing lattice st
withstanding the extremes o
deriving from the "Roaring Fo

The new tower has been
Broadcasting to suit the needs
ment. It will consist of a fully e
section with a non-uniform ver
and a radome-enshrouded lat
column from 67m up to approx
to support Band 1, Band 2 an
and the local radio comm
Provision is being made to ena
from the same aperture as th
will be circular in cross-section
be fitted with tuned liquid damp
wind-induced dynamic motion
this tower have been derived
in maintaining the existing tow

The existing tower was built
by Johns & Waygood Ltd, to
array. During the following
damage due to falling ice. This
blem with a degraded broadca
mon during winter, and str
required during summer. By t
array had reached the end o
replacement array was planne
ter protective radome. Tower
tion and radome construction c
mer of 1979-80 and was finally
mer of 1982-83. Included in
extension to the tower to sup
within a 2.0m diameter radome
antenna was added within the
broadcast SBS television.

Although the radome was
damage to the antennas, it cre
ated with wind-induced dyna
tower. This led to an on-going
ticularly associated with bolted
tower. The fitting of tuned li
tower in 1992 has helped re
problems. Ice damage to the
tower continues and maintena
the frequent occurrence of inc

The existing tower and its
capable of being satisfactory
additional television and FM b
broadcast. This in conjunctio
nance requirements formed t
struction of a replacement tow
mental work to this end sta
Following an extensive enviro
including public forums, the g
the new tower was finalised
presented to the Hobart City C
in February 1993. After a
cratic process, planning

MOUNT WELLINGTON

UNIQUE BROADCASTING TOWER

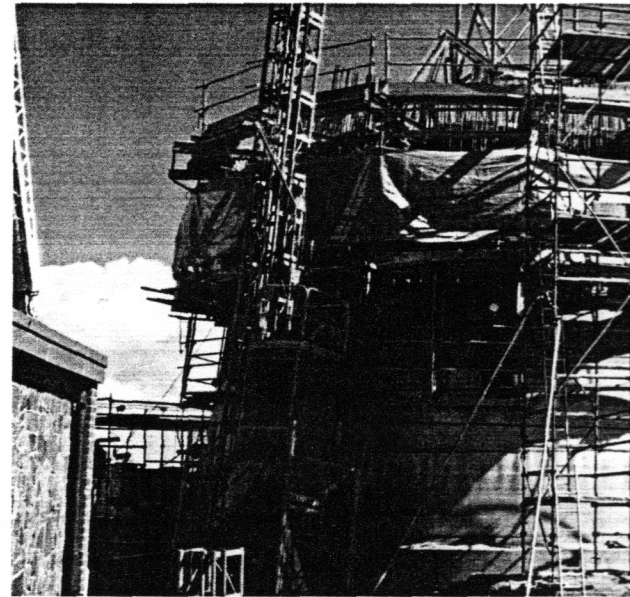
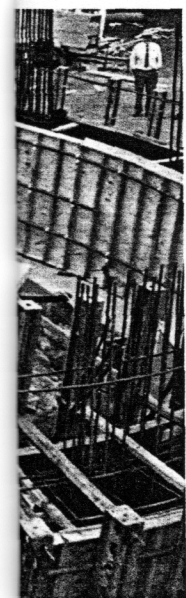
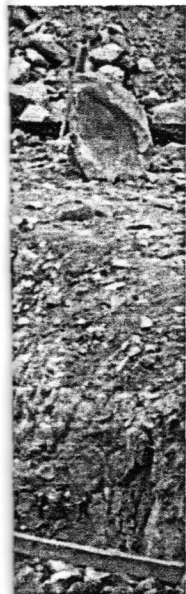
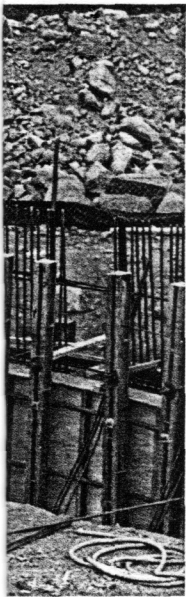
As part of equalisation in Tasmania, a new broadcasting tower is being constructed at 1252m above sea level on Mt Wellington, overlooking Hobart. This tower is to replace the existing lattice steel tower, which has been withstanding the extremes of the snow, ice and winds deriving from the "Roaring Forties" for the last 34 years.

The new tower has been designed by Telecom Broadcasting to suit the needs of the site and the environment. It will consist of a fully enclosed reinforced concrete section with a non-uniform vertical taper up to 67m height, and a radome-enshrouded latticed steel antenna support column from 67m up to approximately 130m. The tower is to support Band 1, Band 2 and Band 4/5 antenna arrays, and the local radio communication requirements. Provision is being made to enable broadcasting on Band 3 from the same aperture as the Band 2 array. The tower will be circular in cross-section over its total height and will be fitted with tuned liquid dampers to absorb the energy of wind-induced dynamic motions. Many of the features of this tower have been derived from the experience gained in maintaining the existing tower.

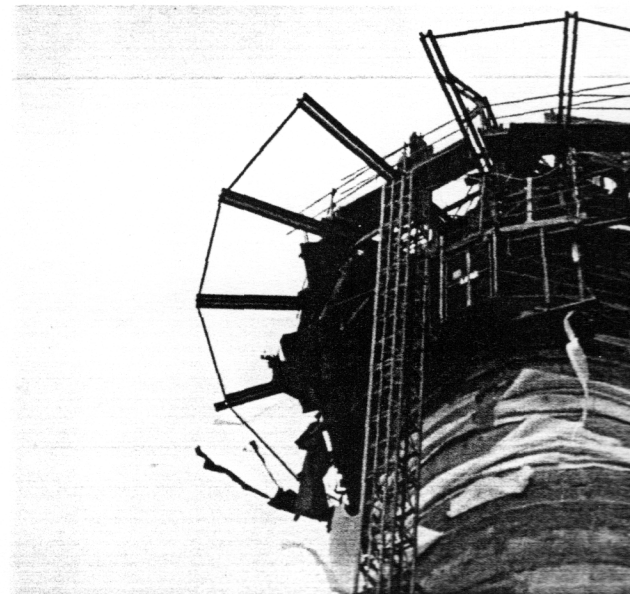
The existing tower was built in the summer of 1959-60 by Johns & Waygood Ltd, to support the ABT-2 antenna array. During the following winter it suffered extensive damage due to falling ice. This became an on-going problem with a degraded broadcast signal being not uncommon during winter, and structural repairs frequently required during summer. By the late 1970's the antenna array had reached the end of its serviceable life and a replacement array was planned along with a 7.6m diameter protective radome. Tower upgrading, antenna installation and radome construction commenced during the summer of 1979-80 and was finally completed during the summer of 1982-83. Included in this work was a 12m high extension to the tower to support an FM antenna array within a 2.0m diameter radome. A single channel UHF slot antenna was added within the Band 1 radome in 1986 to broadcast SBS television.

Although the radome was successful in stopping ice damage to the antennas, it created other problems associated with wind-induced dynamic excitation of the whole tower. This led to an on-going maintenance problem, particularly associated with bolted connections throughout the tower. The fitting of tuned liquid dampers high up in the tower in 1992 has helped reduce the vibration-related problems. Ice damage to the open latticed sections of the tower continues and maintenance is difficult because of the frequent occurrence of inclement weather.

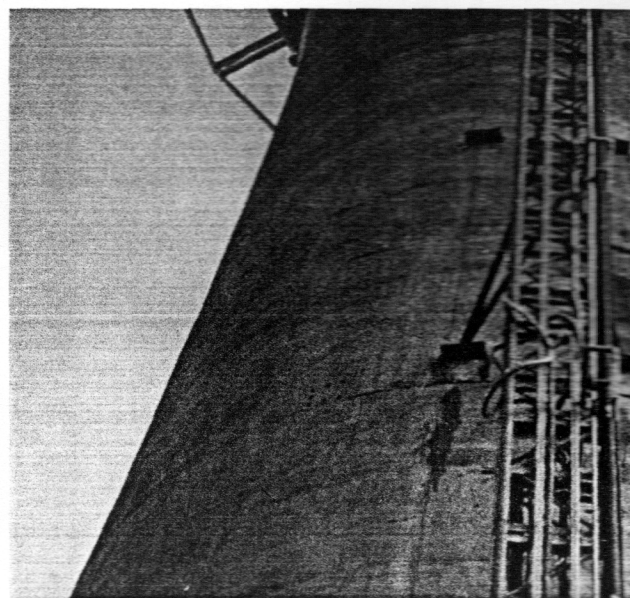
The existing tower and its antenna systems are not capable of being satisfactorily upgraded to support the additional television and FM radio services required to be broadcast. This in conjunction with the significant maintenance requirements formed the justification for the construction of a replacement tower. Planning and developmental work to this end started in December 1991. Following an extensive environmental impact assessment including public forums, the general form and location of the new tower was finalised and two variations of this were presented to the Hobart City Council for planning approval in February 1993. After a number of steps in the bureaucratic process, planning approval was granted in July,



Slipform at RL 5.0m and progressing upwards.



Close up view of slip form and hoist guide frame.



Alimak personnel access hoist guide frame attached to the

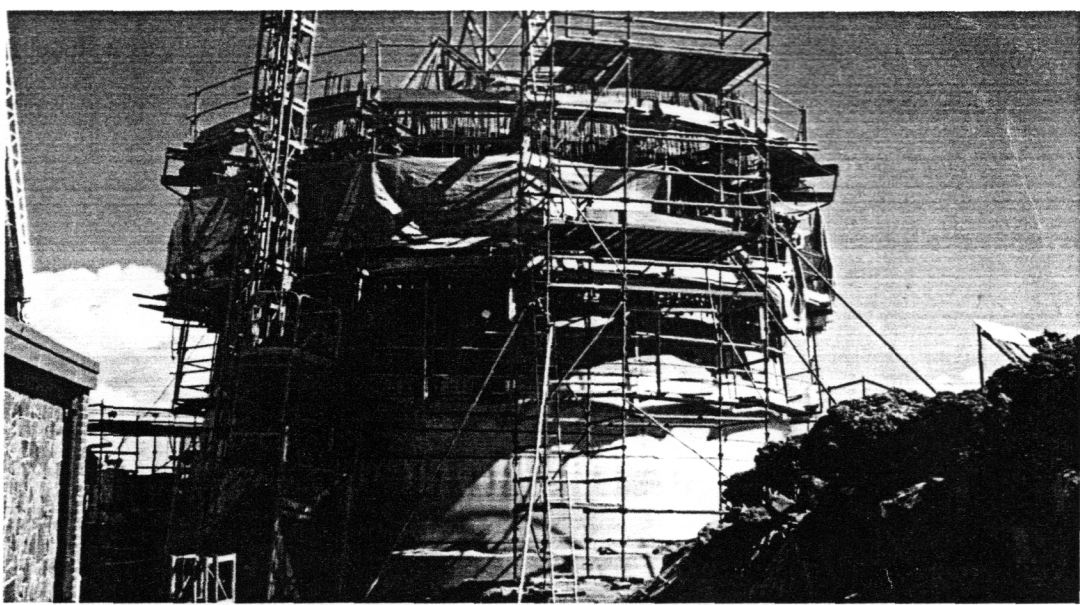
TING TOWER

ania, a new broadcast-
252m above sea level
part. This tower is to
tower, which has been
snow, ice and winds
for the last 34 years.
assigned by Telecom
the site and the environ-
sed reinforced concrete
taper up to 67m height,
steel antenna support
ely 130m. The tower is
and 4/5 antenna arrays,
ation requirements.
broadcasting on Band 3
and 2 array. The tower
its total height and will
to absorb the energy of
Many of the features of
the experience gained

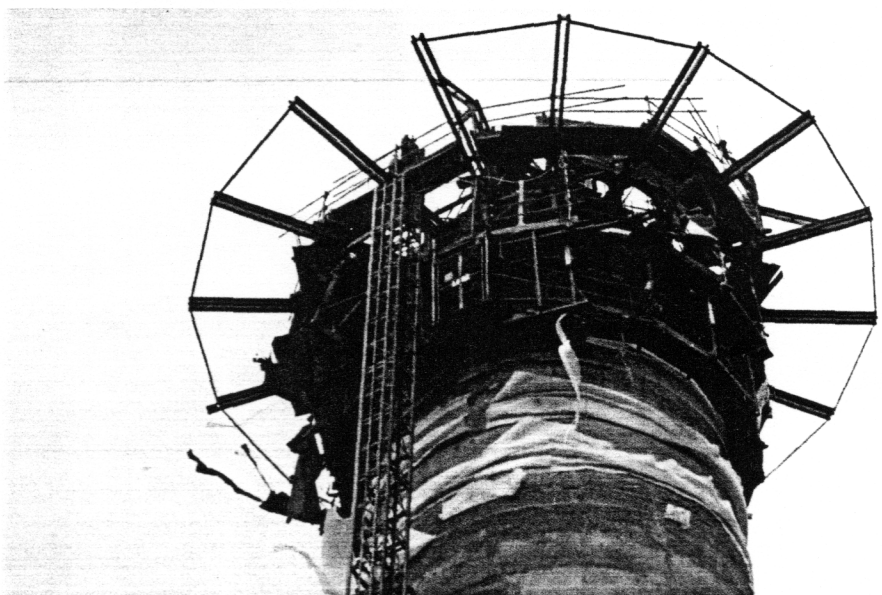
the summer of 1959-60
port the ABT-2 antenna
er it suffered extensive
came an on-going prob-
gnal being not uncom-
ral repairs frequently
ate 1970's the antenna
serviceable life and a
ong with a 7.6m diame-
ading, antenna installa-
nenced during the sum-
npleted during the sum-
work was a 12m high
t an FM antenna array
single channel UHF slot
nd 1 radome in 1986 to

cessful in stopping ice
l other problems associ-
excitation of the whole
intenance problem, par-
nections throughout the
dampers high up in the
e the vibration-related
n latticed sections of the
e is difficult because of
nt weather.

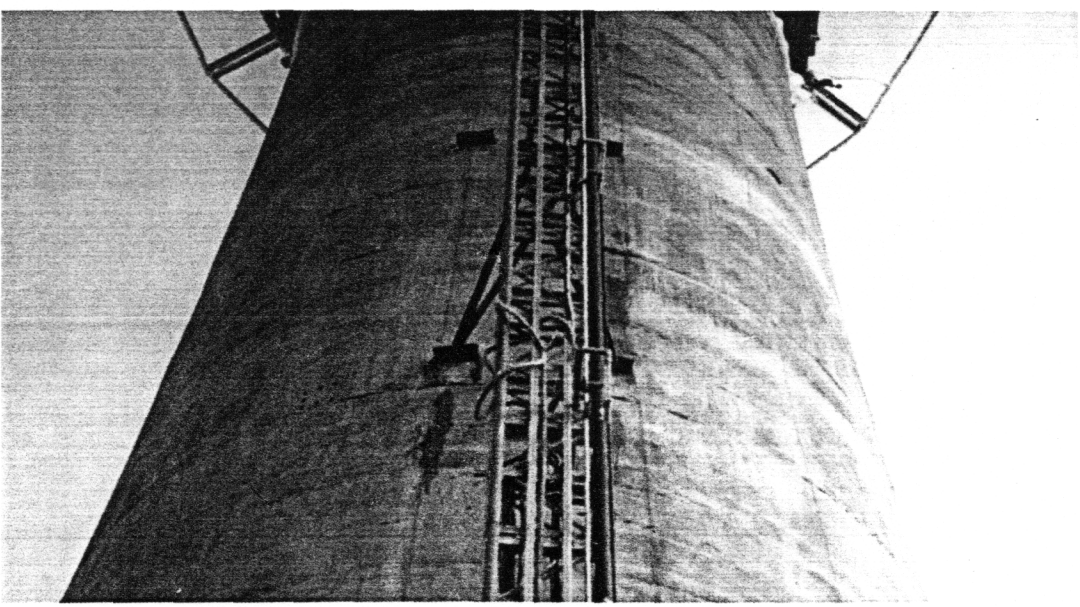
tenna systems are not
ograded to support the
services required to be
h the significant mainte-
ustification for the con-
Planning and develop-
d in December 1991.
ntal impact assessment
ral form and location of
o variations of this were
cil for planning approval
r of steps in the bureau-
al was granted in July,



Slipform at RL 5.0m and progressing upwards.



Close up view of slip form and hoist guide frame.



Alimak personnel access hoist guide frame attached to the tower.

1993 and Federal Parliamentary funding approval was granted in December, 1993.

The primary loading for the design of the tower is wind loading, and this has been derived from Bureau of Meteorology wind data recorded on the Mt Wellington Broadcasting Site over a number of years. These wind loading parameters confirm Mt Wellington's reputation of being a very windy place.

The new tower is to be constructed in two stages over two summer seasons. Stage 1 consists of the reinforced concrete section up to RL 67m and the associated internal access and cable runway steelwork. Stage 2 is to include the lattice steel support column, the antenna arrays, tuned liquid dampers and the radome.

The design of the tower has included a dynamic analysis to determine the tower's sensitivity to wind excitations in both the along-wind and cross-wind directions. Specially designed Tuned Liquid Dampers will be installed at two levels high up in the tower to absorb the energy of any wind-induced movement, particularly in the vicinities of the fundamental natural frequencies of the tower. This will be beneficial to the tower serviceability deflection requirements and to the long-term fatigue life of the structural components.

The design of Stage 1 was sub-contracted to the consulting engineering group Structural Mechanics & Dynamics. They have also been awarded the design and supply of the Tuned Liquid Dampers. A contract for the construction of the Stage 1 was let in December 1993 to Concrete Constructions (Tasmania). Construction commenced in January 1994 with the excavation of the foundations and pouring of blinding concrete, approximately 90 cubic metres of which was used to replace significant clay seams in the foundation rock. The ring beam was then anchored to the bedrock by 18 rock anchors at depths varying between 10 and 15 metres. Each of these were post-tensioned to 2000 kN ($\approx$ 200 tonnes).

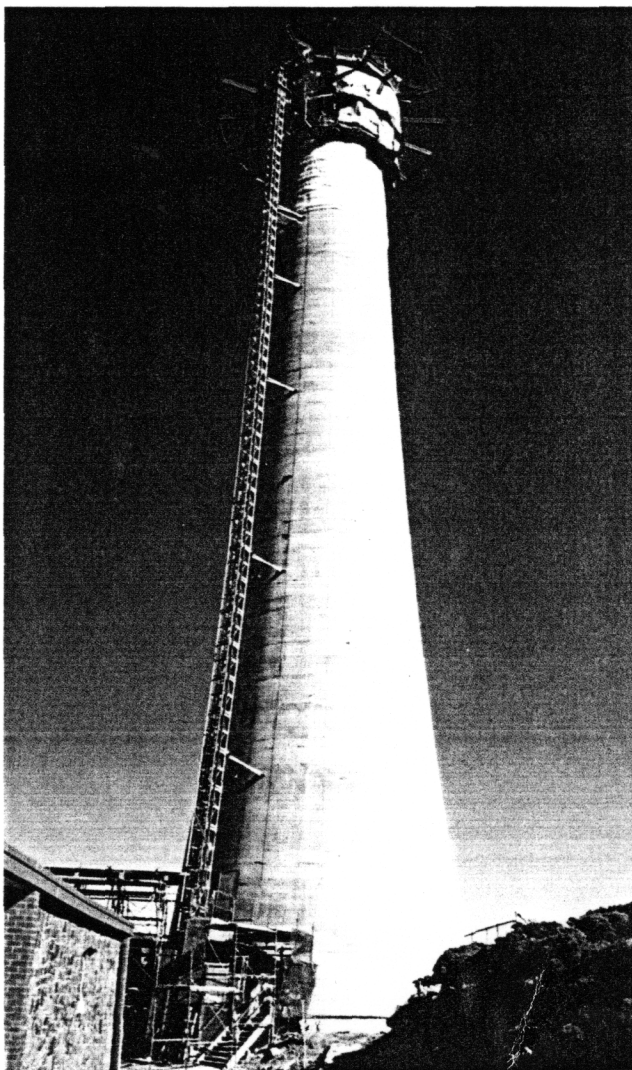
The tower shaft was poured using a specially designed slipform. The slipform was based on a Swedish design, incorporating the ability to reduce in diameter and vary the wall thickness and slope. This occurred while constantly moving upwards at an optimum rate of approximately 200mm per hour. It was assembled on the ring beam and after tests and adjustments, the concrete pour commenced on 23 March. Due to some technical problems and the frequent intervention of the weather, the slipforming period was extended from 3 weeks to approximately 8 weeks.

Although it was scheduled to operate continuously 24 hours per day for up to 6 days the regular occurrence of high winds, snow and icing frequently made shut-downs necessary, particularly in the latter stage of the slipforming operation. Construction work often continued in the poor weather conditions until a stoppage was forced by the wind speed exceeding the maximum operating speed of the Alimak personnel access hoist.

The tower is to be temporarily capped during the winter period and the internal access ladders and cable runway steelwork is to be installed before the commencement of Stage 2 of the construction, scheduled for November 1994.



Final stage of slipform assembly and adjustment.



Slipform at RL49m and progressing upwards.

TOM GLASS