



GOLD FIELDS



Driefontein-4 Shaft

Pillar Extraction - Engineering

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28 JULY 2005



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Pillar Extraction - Engineering

Agenda

Geology

Seismicity

Steelwork

- Secondary Support
- Suspended Tower
- Bridge
- Design Modification
- Sliding Guides
- Counterweight Modifications

Reef Cut Through Shaft

Instrumentation

Highlights

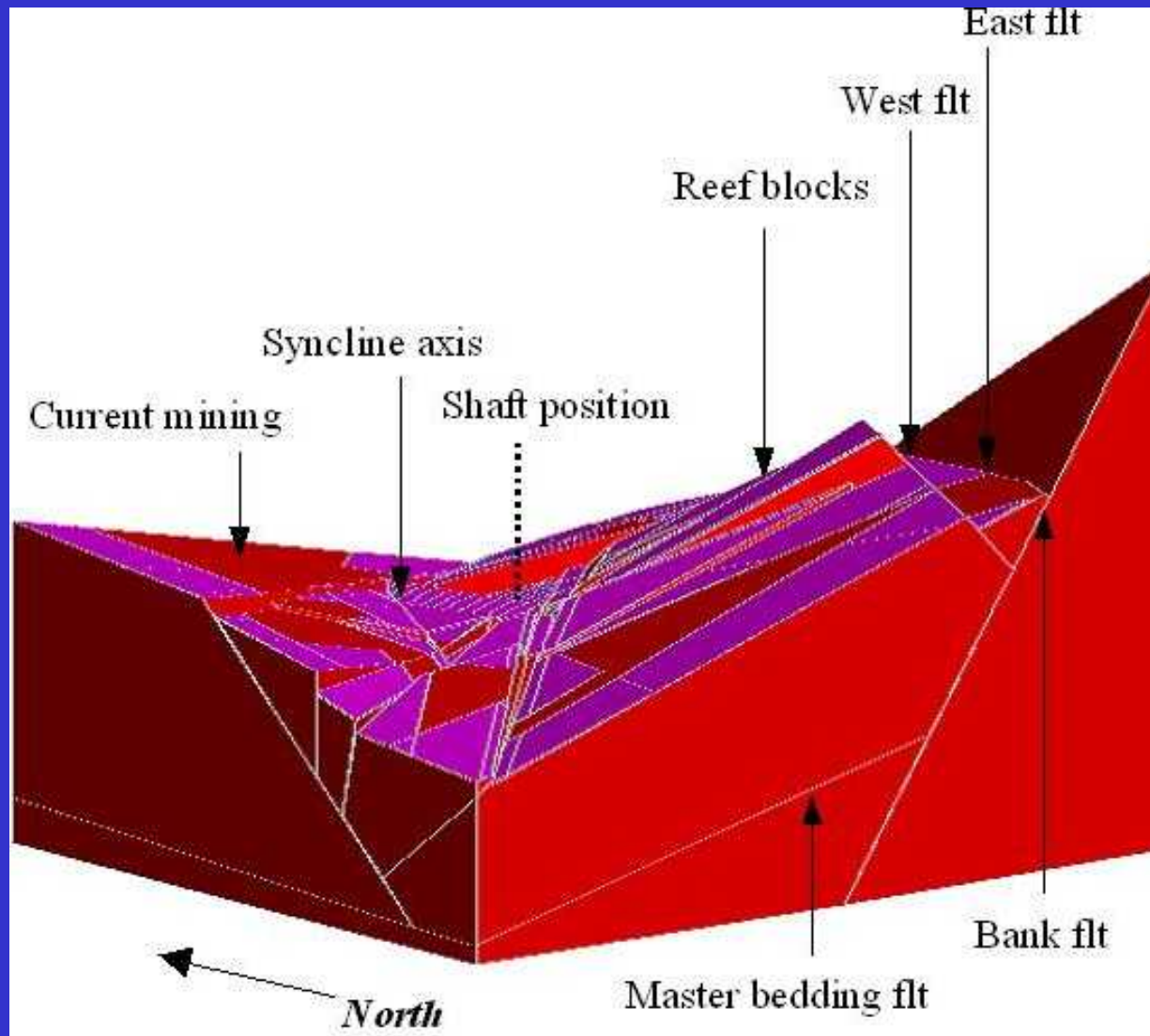
Questions ?



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Geological Structure

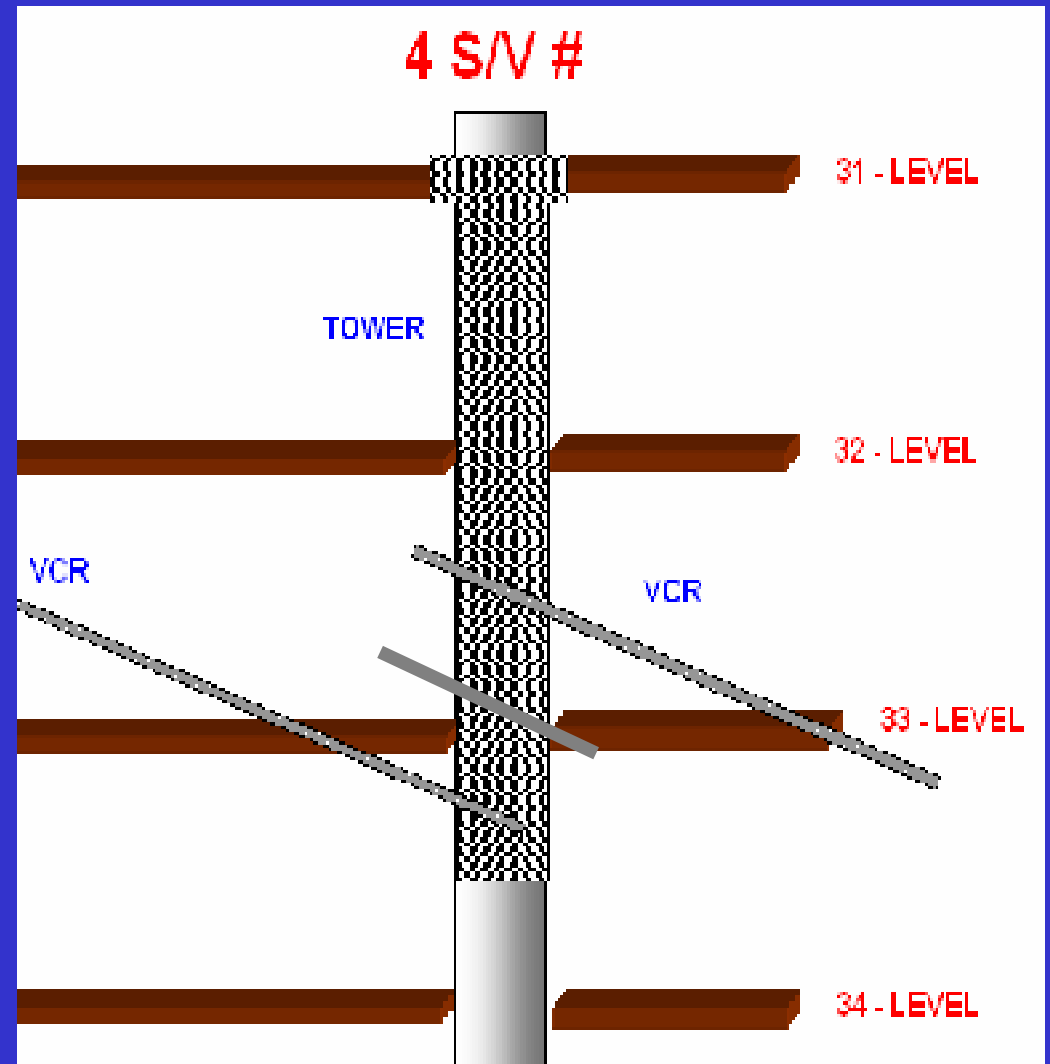
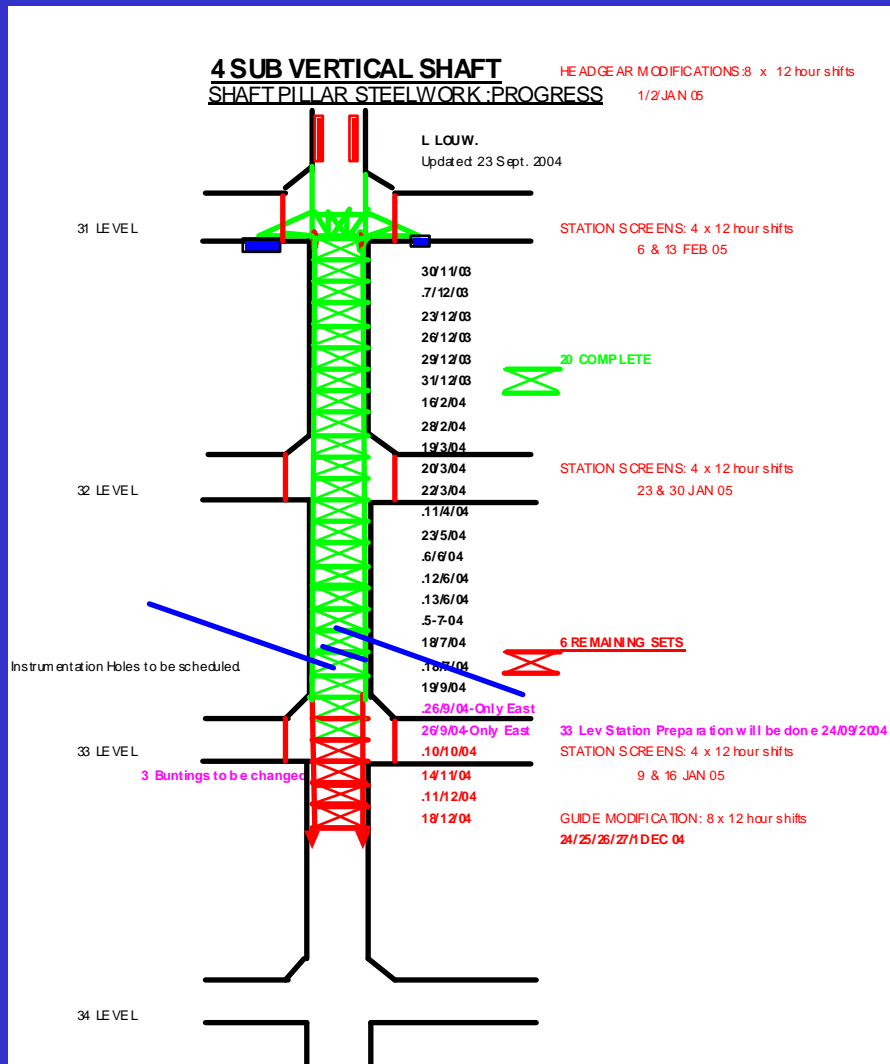




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Tower Positioning

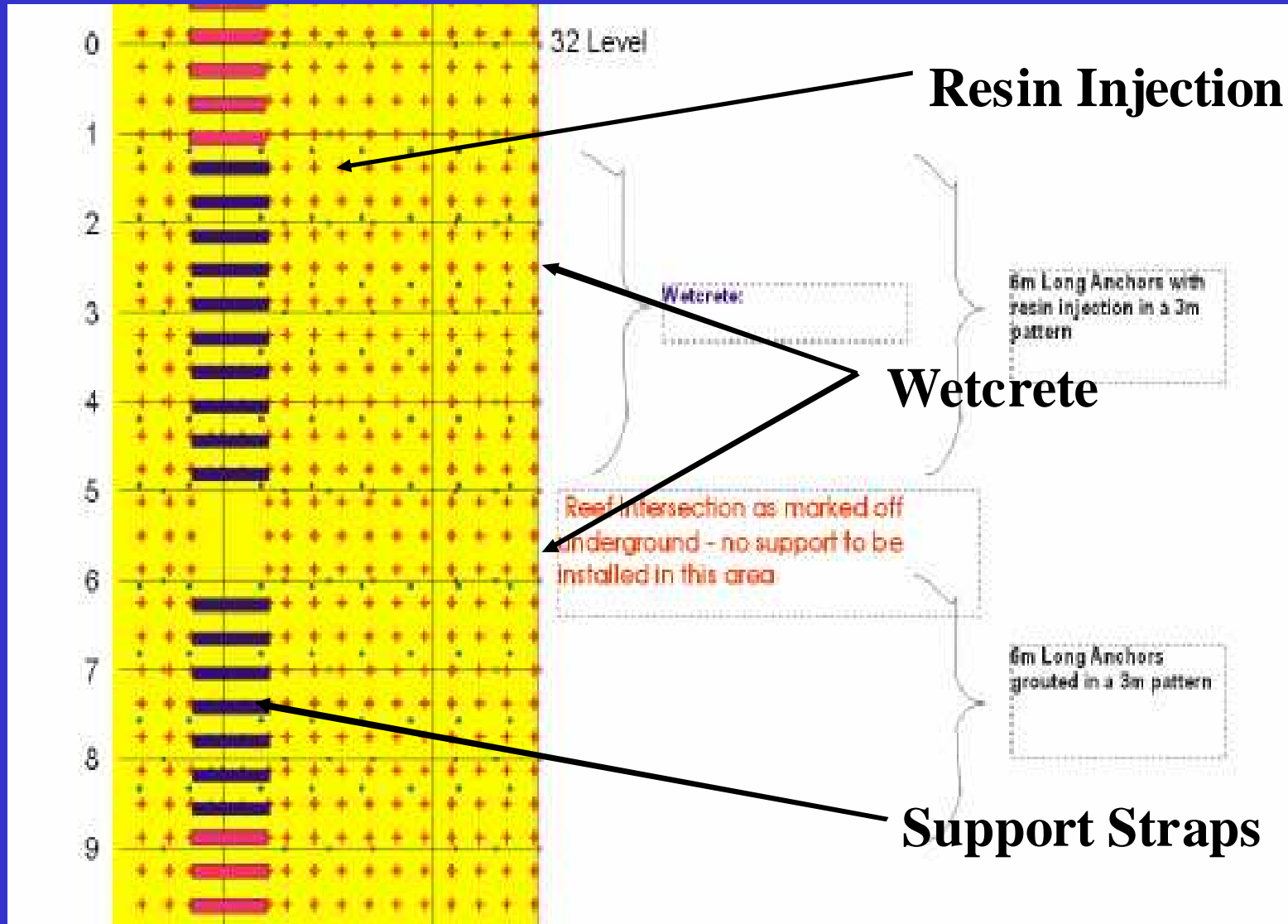




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Shaft Pillar Support





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Pillar Extraction - Engineering

Affected Engineering Infrastructures

- Ø Shaft Ore-pass system between 32 and 33 level
- Ø 33 level Station area (workshops)
- Ø 32 level CLO Area
- Ø 33 level CLO Area
- Ø All drainholes between 32 and 34 levels
- Ø Ventilation holes from 34 level up to 31 level
- Ø Interlevel travelling way next to shaft barrel
- Ø Backfill infrastructure between 32 and 34 level



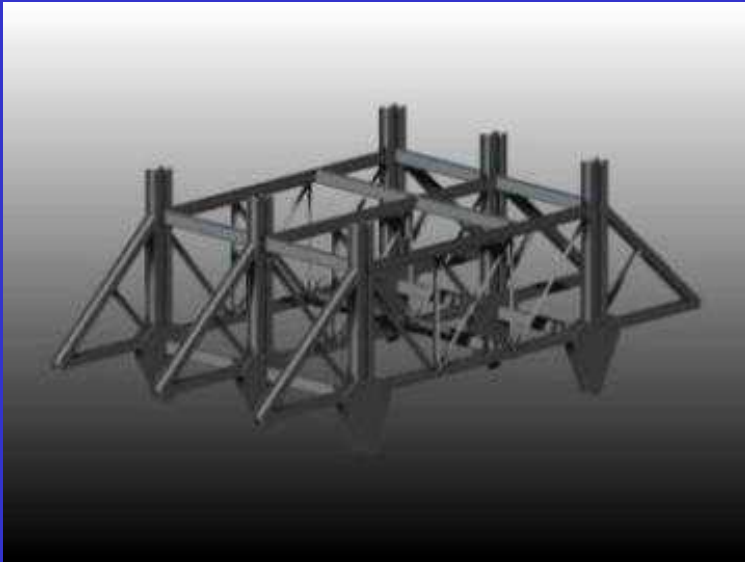




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Shaft Pillar Steelwork.

Bridge



Bridge Design Criteria

- Carry 200 ton of steel.
- Deflection as per design.
- Full speed winder operation. 12 m/s
- Unhindered access.











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Shaft Pillar Steelwork.

Suspended Tower



132m suspended tower

- Team was trained on replica of Sub Vertical Shaft steelwork layout.
- Safe work practices was developed without putting anyone in danger.
- Modifications could be done without major cost or time implication.
- All sets were assembled on surface before U/G installation







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Shaft Pillar Steelwork.

Design Modifications

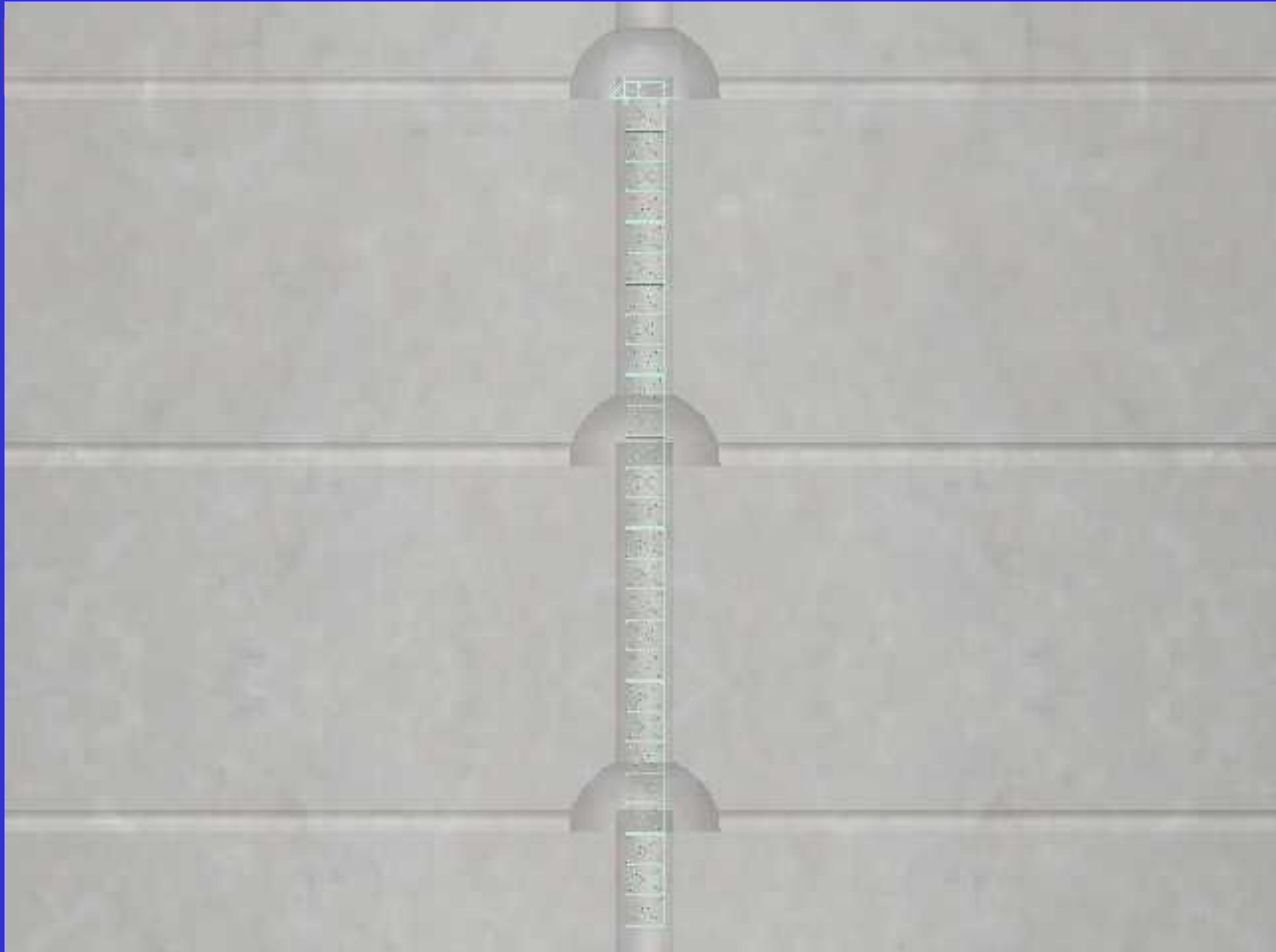
- Steelwork totally disconnected from shaft sidewall
- Counterweight modified to run on two independent guide sets
- Counterweight Jack-Catches modified
- All services removed from sidewall and attached to suspended tower





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Shaft Pillar Steelwork

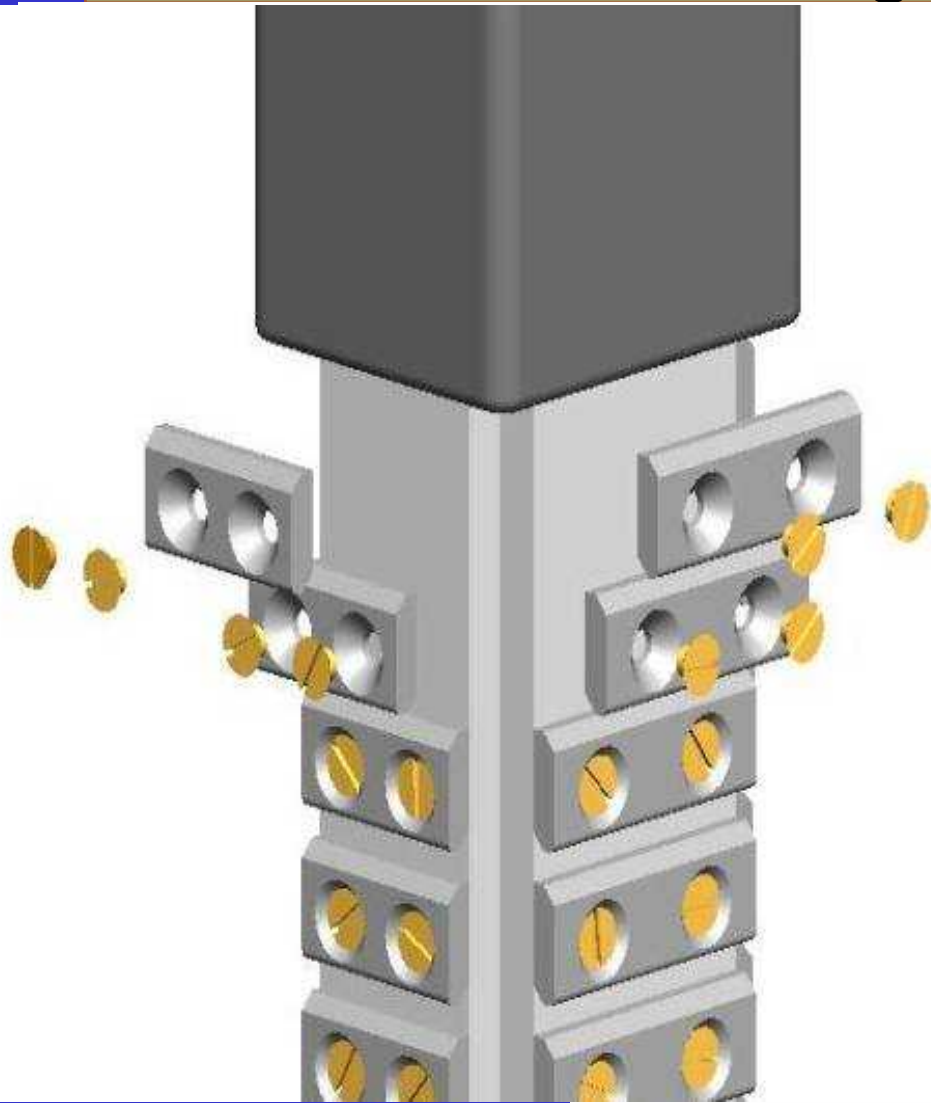




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Shaft Pillar Steelwork

Sliding Guides



INNOVATIVE NEW DESIGN

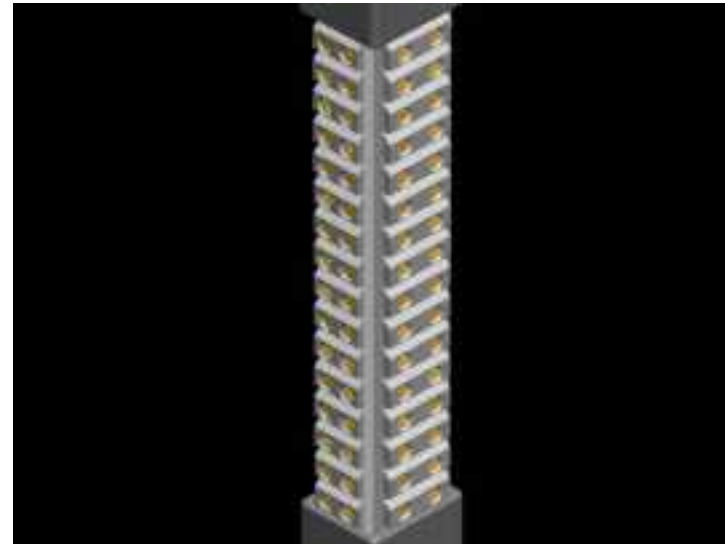
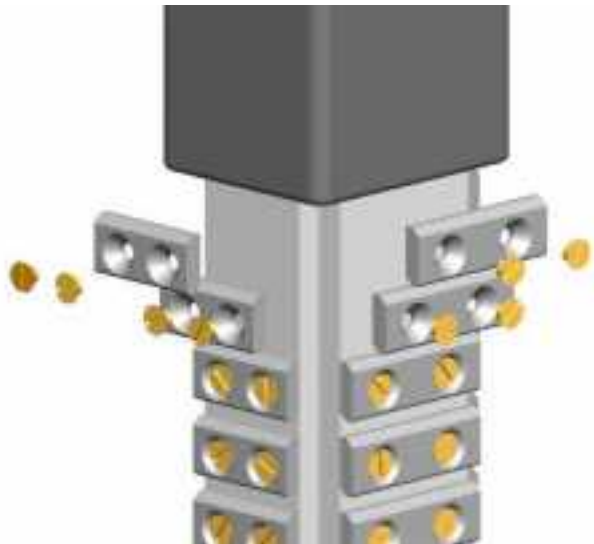
1. MAXIMUM FREE RIDE=NIL
2. SMOOTH RUNNING SURFACE
3. 750 MM CLOSURE AVAILABLE
4. All 16 CORES ARE RE-USABLE
5. SHEAR AT 7 TONNE/ADJUSTABLE
6. VISABLE MONITORING POSSIBLE



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Shaft Pillar Steelwork

Shaft Steelwork – Sliding Guides



- Consists of aluminium brackets attached with brass screws
- Brass screws shear at force of 30 000N and bracket falls away







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Shaft Pillar Steelwork

Counterweight Modifications

Counterweight.

Guide changeover.

Dolly wheel bracket design.



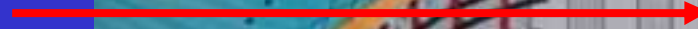


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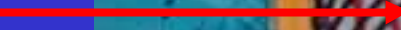
Shaft Pillar Steelwork

Reef Cut Through Shaft

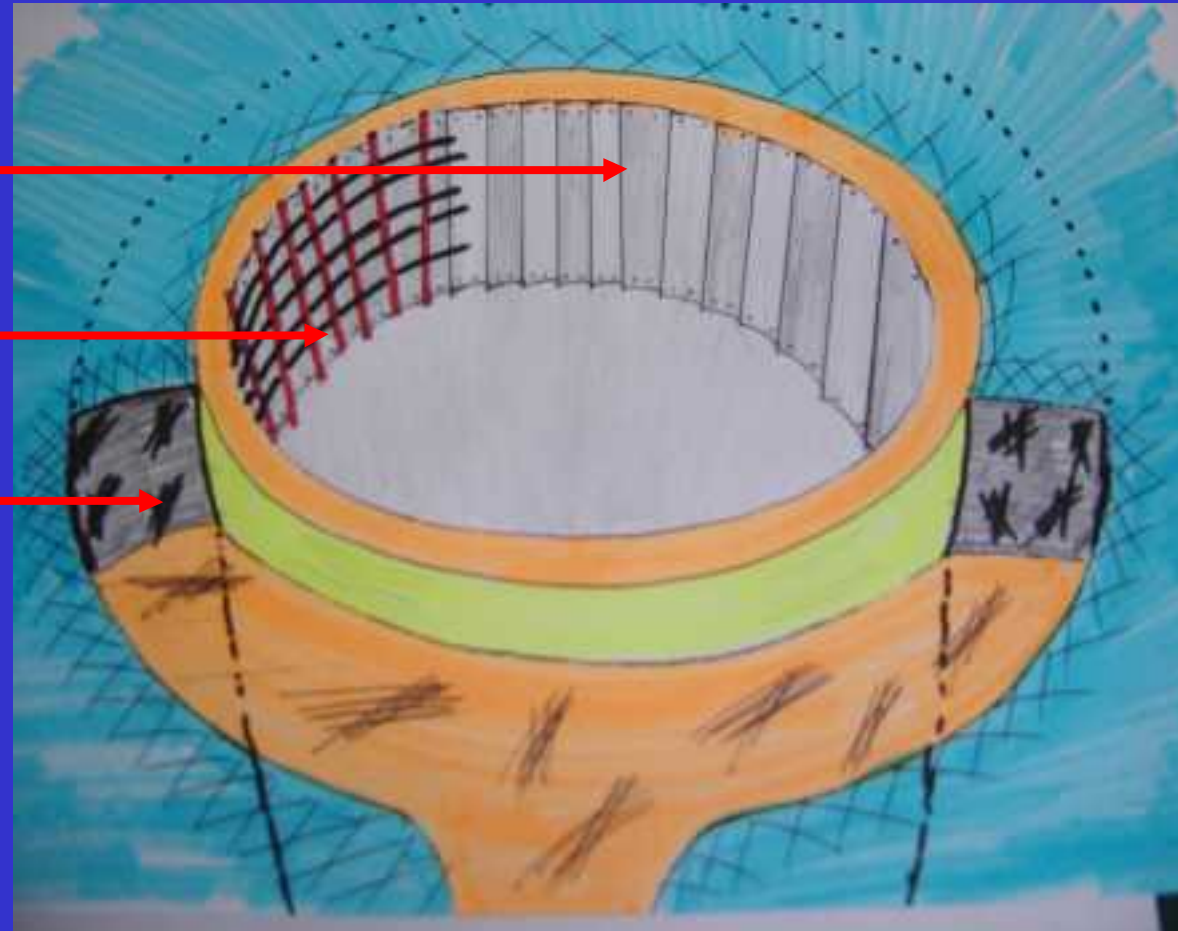
Conveyor



Winder Rope



3 m Cut around #

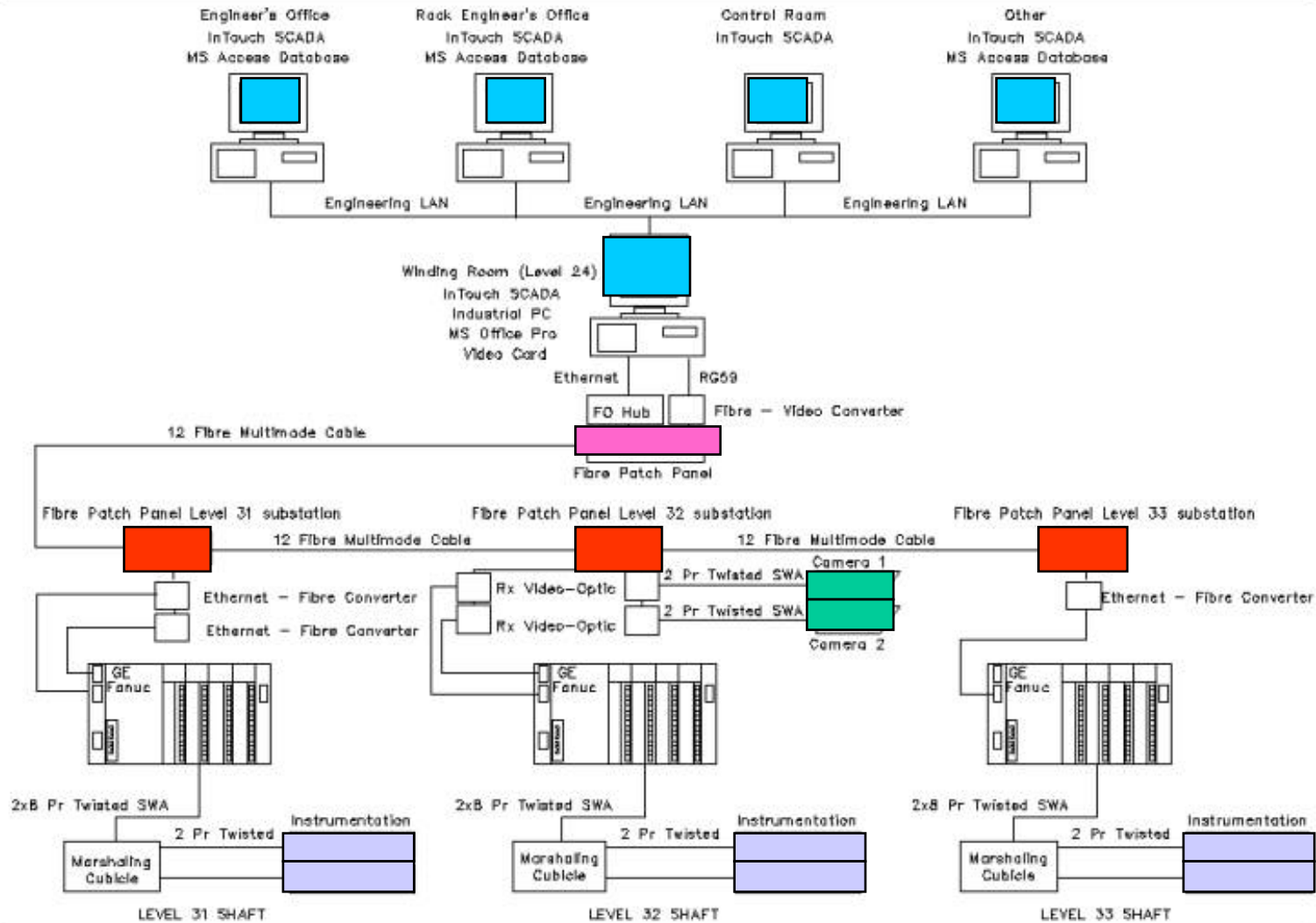


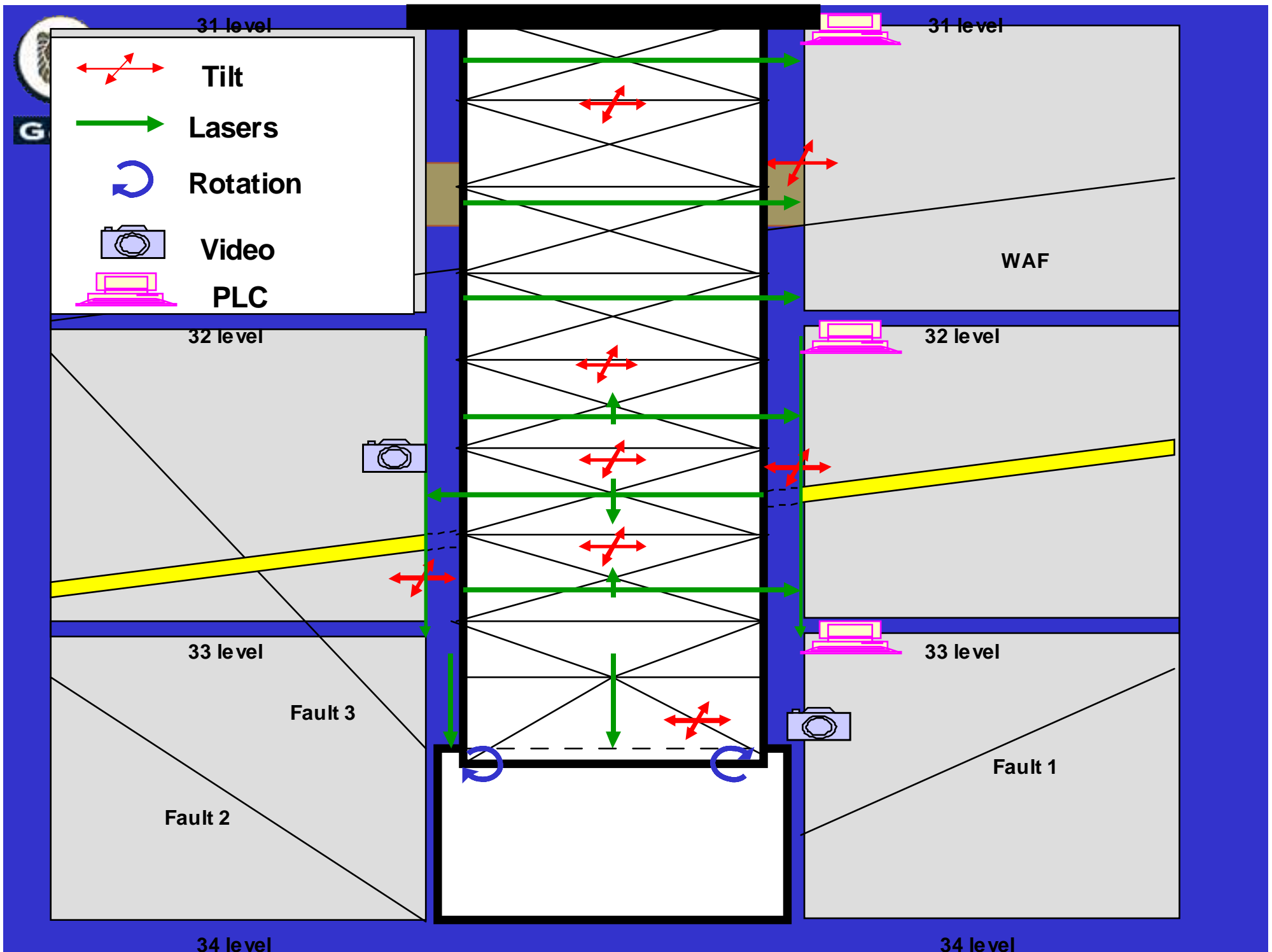


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Shaft Pillar Steelwork

INSTRUMENTATION







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Shaft Pillar Steelwork

HIGHLIGHTS

Tower installation took 16 months.

No lost shift accidents.

Only mine employees was used.

Cost was within approved Budget.

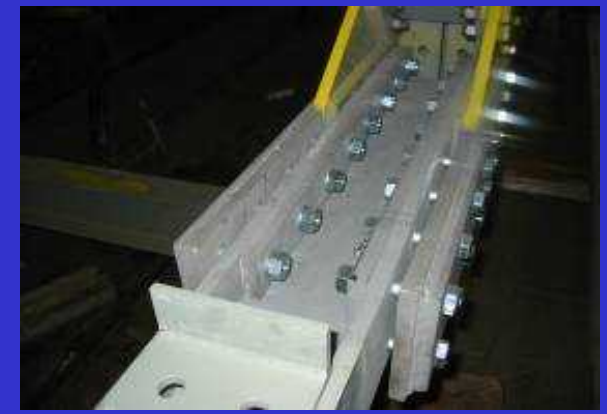
Tower Installation did not interfere with Production.



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QUESTIONS ?





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