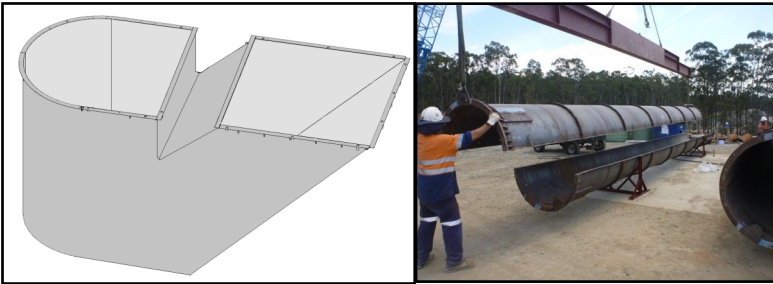


## Liners

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Mancala has adapted and improved the process of using galvanised liners as a non-entry method of ground control for vertical raise bored shafts. The concept uses “modular” liner segments that are bolted together as the installation is lowered into position immediately after the raise borer has completed reaming the shaft.

Originally developed for use in shaft Pre-Sink applications, this method has now been used for shaft diameters of up to 5.5m and to depths of 400m.



### Liner Services Include

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- Design
- Certification
- Statutory approval
- Fabrication
- Raise boring
- Installation
- Shaft ground support
- Civil engineering and construction
- Fan adaption and connection

The Mancala Group

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# Total Shaft Solutions

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The application of steel liners has been used to address raise-bored shaft wall instability which is common in poorly consolidated and weathered ground located below the shaft collar.

Historically, these sections of shaft have required pre-sinks, box cuts or post sink construction work to provide wall stability before/after completion of raise boring.



Steel liners are an addition to a full suite of shaft construction solutions which now include raise boring collar civil construction, remote shotcrete, inset placed pile curtain collars, egress ladders and more. Mancala can tailor a shaft solution to suit our client's requirements.



## Capabilities:

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- Modules are assembled and made ready for installation while raise boring is taking place; allowing for installation rates of up to 30 to 40 metres per day
- Labour and equipment cost are minimised
- A non-entry method improves safety for personnel
- The liner collar can be made to fit the installation of Discharge/Inlet Evase, fan elbow or other fan installation
- Adaptors for GAG injection are available for shaft of up to 5.5m diameter
- Liner/Ladder combination design for ground support and second means of egress has been developed
- Sub-level Y piece/bends developed and available, installed in modular segments
- Liner installation solutions without use of large cranes

## The Mancala Group

- **SAFETY:** Striving to achieve zero harm
- **QUALITY:** Taking pride in what we make and do; on time, on budget and to specification
- **INTEGRITY:** Doing what we say we will do with honesty and respect
- **INNOVATION:** Revolutionising processes and applying technology to achieve better outcomes for all stakeholders
- **PEOPLE:** Recognising people as our greatest asset and encourage personal excellence