

Specification and Design Audit of Mining and Mineral Processing Equipment

The Need for High Reliability

The motivation for auditing the design of mineral processing equipment is clearly to improve system reliability. If processing equipment has poor reliability, production will be inconsistent and target shortfalls will result. Cash flow can be reduced. Maintenance costs will be higher than expected and this also affects profitability.

In addition, safety is affected by the adequacy of the design and by overall system availability. Poor reliability can be considered as having three basic causes:

- **Inadequate design**

If the designer had a poor understanding of the loads that actually occur in service, or if arithmetic or conceptual errors were made, the delivered equipment will be unreliable. Occasionally, the design fails to consider a vital load case or a poorly analysed design is sold into an application beyond its capability.

- **Poor Quality – material or workmanship problems**

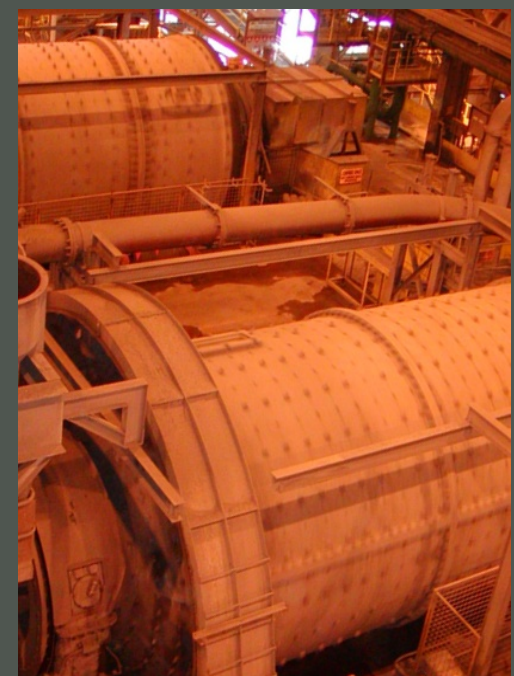
If the construction was carried out at a standard lower than the designer required, or with sub-standard materials, the equipment will be unreliable.

- **Operation outside design limits**

If the equipment is operated beyond its design capacity, it will be unreliable.

In purchasing a high capital item, the purchaser can take steps to ensure each of these causes are eliminated or reduced:

- **Inadequate design –** Specification and Design Audit
- **Poor quality –** Agreed ITPs, Quality Surveillance
- **Operation outside design limits –** Operator training and monitoring





Many mining companies realise the importance of undertaking QA on systems being purchased. Yet there is very little point in doing an extremely thorough job of QA if the design is inadequate to start with. Design audits therefore aim to eliminate design problems before the equipment is built.

Plants worldwide report breakdown as a prime contributor to downtime. Consequently there is great scope for design audits to recover their cost many times over.

BMT WBM Design Audits

The way BMT WBM Design Audits normally work is as follows.

BMT WBM contributes to the technical component of the purchase specification which is released to all tenderers. The purchaser's reliability requirements are explicitly stated and the ground rules for the audit are included in the specification. The vendors are informed that it is a condition of the contract that the design be audited.

Once the supplier is selected and before the component is built, the final design is audited. Any aspect which does not meet the purchase specification is changed to meet the spec at the supplier's cost.

BMT WBM design audits are undertaken at a level of effort commensurate with the novelty of the design (and therefore the risk to the purchaser). Calculations and finite element modelling can be undertaken independently of the supplier.

Design Audits are a very powerful way of obtaining mining machinery and bulk handling equipment that has better-than-industry-standard reliability.