

Bennett

ASSOCIATES

Handling of Nuclear Waste in Underground Storage

J L Bonfield

Principal Consultant

© M G Bennett & Associates



High Integrity

Bennett

ASSOCIATES

High Integrity

- What does High Integrity mean?

High Integrity

- **What does High Integrity mean?**
- **Significant Hazard to the Public.**

High Integrity

- **Typical Equipment**
 - **Reactor Core Handling**

High Integrity

- **The place in Waste Handling.**

The Purpose of Underground Storage

- To allay Public Anxiety
- Unburden the Nuclear Industry.

Availability, Reliability and Maintainability

- High Integrity \neq Reliable

Availability, Reliability and Maintainability

- **Availability** – operating when needed.
- **Reliability** – not failing even to a safe state.
- **Maintainability** – physically possible to maintain.

Effects of Unreliability

- **Economic impact.**
- **Safety impact.**
- **Higher demands on maintainability.**

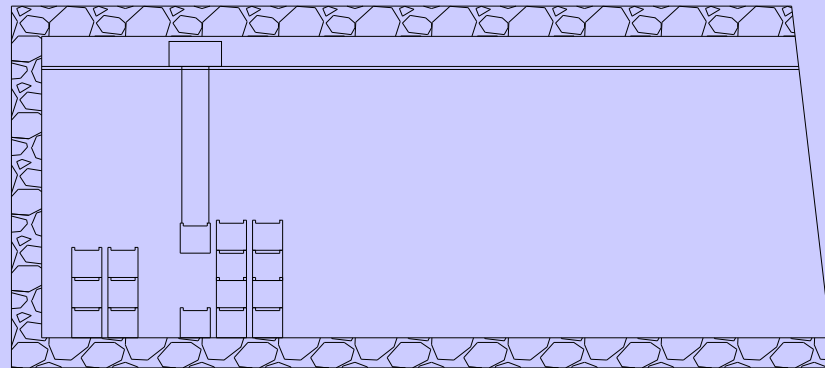
Steps to Improve Reliability

- **Simplicity.**
- **Robust Design.**
- **Avoid Novelty.**

The Role of Handling Equipment

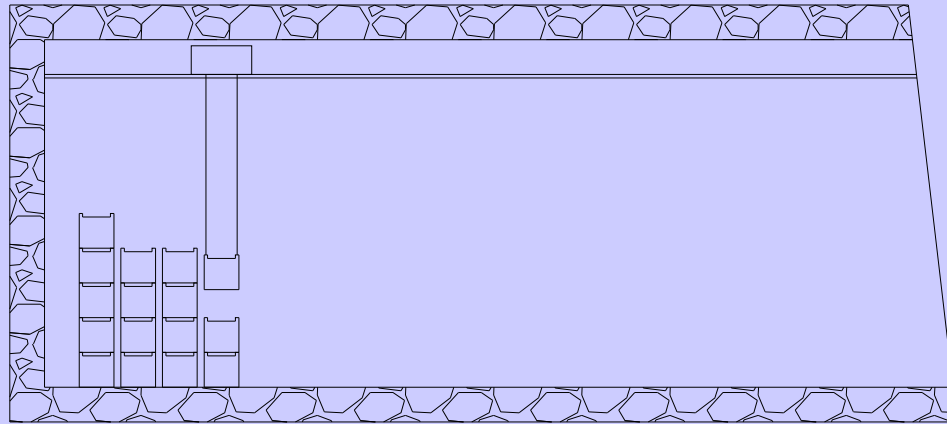
- Integral part of the storage system.
- Placing and retrieving waste.

Retrieval of Stored Material Handling Equipment



- **Manipulate material in store.**
- **Maintain a complex inventory position record.**

Place and Forget Handling Equipment

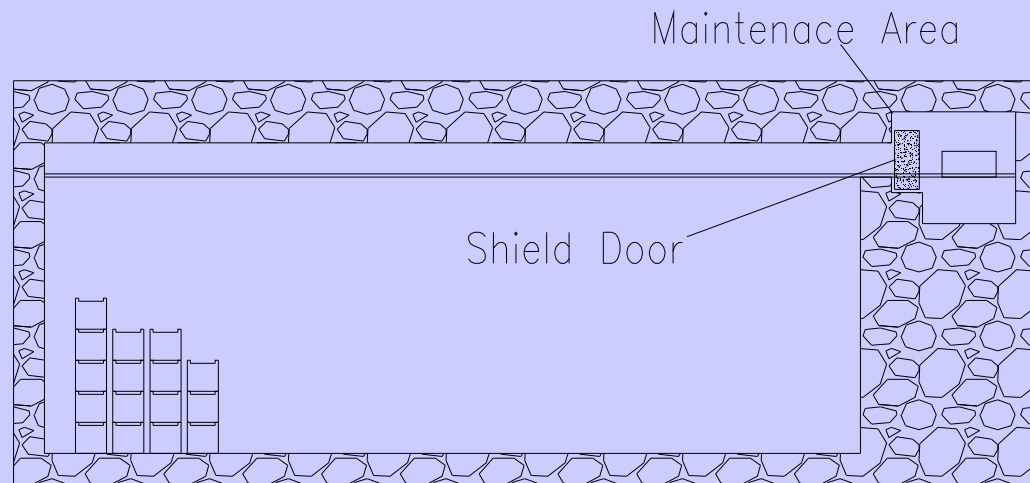


- **Equipment never trapped by inventory.**
- **A simplified inventory position record.**

Maintenance

- **Maximise equipment off board.**
- **Use high reliability equipment on board.**
- **Replace degradable equipment.**
- **Provide Biologically shielded maintenance areas.**

Maintenance Areas



- **Dedicated shielded maintenance area.**
- **Movable shield door**
- **Simplified retrieval access**

Conclusions

- **The challenge**
 - To fully define the intent.
 - To define how the waste can be stored.
 - Early involvement of material handling.

Bennett

ASSOCIATES

Handling of Nuclear Waste in Underground Storage

J L Bonfield

Principal Consultant

© M G Bennett & Associates

