DMT Rig Risk Assessment

Hazards, harms, control measures and emergency procedures for subassembly and supergroup testing.

Test	No.	Hazard	Who can it harm?	How can it harm?	Existing controls	Additional controls
Subassembly	1	Moving parts (motor shafts, drive transmission)	Student, technicians, demonstrators	Fingers, hands or clothing may become caught in moving components, causing pinching, crushing or cuts.	Safety visors in place; emergency stop switch accessible; mandatory use of safety goggles and lab coats.	Operation supervised at all times; users maintain safe distance; motor speed limited to 150 RPM.
Subassembly	2	Electrical components (power supply, wiring, driver boards)	Students operating the rig	Electrical shock, burns or fire risk due to short circuits.	Insulated wiring; equipment PAT tested.	Routine visual inspection of cables and connections before use.
Subassembly	3	Tripping (wires/cables from electronics/power supply)	Students and technicians nearby	Trips over loose or trailing cables, leading to falls, injury or equipment damage.	Cables routed toward the back of the frame where possible; cables taped/tied together.	Keep floor clear of unnecessary cables; perform visual check before operation; use cable covers where possible.
Subassembly	4	Sharp edges on metal components (waterjet cut parts)	Students assembling or handling the rig	Cuts or abrasions from sharp or unfinished edges.	Sharp edges deburred where possible; gloves worn during handling.	Fit protective edge trim where required; inspect components before assembly.
Subassembly	5	Ergonomic strain from lifting	Anyone transporting the rig	Muscle strain, back injury or joint pain from improper lifting techniques.	Ergonomic handles provided; manual handling guidance available.	Assess load weight before lifting; use team lifting where required; use trolleys or mechanical aids where possible.
Subassembly	6	Overheating of motors/electronics	Students and laboratory personnel nearby	Burn injuries or equipment damage due to excessive heat.	Limit operating duration; components rated appropriately for expected loads.	Allow cooling periods; switch off when not in use; install thermocouples and automatic shutdown if temperature exceeds safe limits.
Subassembly	7	Structural instability of rig	Students operating or standing near the rig	Rig tipping or collapsing, causing injury or damage.	Rig mounted on a rigid frame.	Place rig on level surface; clamp frame to floor/bench if necessary; conduct stability checks before operation.
Subassembly	8	Laser hazards (laser displacement sensors)	Students, technicians, anyone nearby	Direct or reflected laser beam exposure causing eye injury.	Sensor clamped and aligned away from eye level; users instructed not to look into beam.	Brief users on laser safety; avoid reflective surfaces in beam path; display laser safety signage.
Supergroup	9	Fluid leakage	Students and technicians nearby	Slip hazards, damage to electrical components, or staining of workspaces.	Electronics enclosed and separated from fluid systems; protective mat placed beneath rig.	Keep spill kits and absorbent materials available; inspect for leaks before operation; clean spills immediately.
Supergroup	10	Airbag burst	Students and staff nearby	If the airbag bursts due to over-pressurisation, debris may scatter and cause injuries.	Maximum design pressure capped at approximately 6 kPa, which is relatively low pressure.	Wear safety goggles during testing.

Emergency Procedures

General requirements

- All users must be briefed on emergency procedures before operating the rig.
- The location of the emergency stop button, power supply isolation, fire exits and spill kits must be clearly identified.
- The rig must not be operated unless all emergency controls are functional.
- Only supervised users are permitted to operate the rig.

Fluid spills

- Stop operation immediately.
- Isolate electrical power if there is any risk of contact with fluids.
- Clean the spill promptly using appropriate materials.
- Inspect electrical components for contamination or damage before restarting.
- Do not resume operation until the area is safe and dry.

Mechanical failure or disassembled parts

- Immediately press the emergency stop button.
- Stand clear of the rig and ensure others maintain a safe distance.
- Isolate the main power supply.
- Do not restart until the fault has been identified and rectified.
- Report the incident to the lab technician.

Entrapment

- Immediately press the emergency stop button.
- Isolate the main power supply.
- Assist the injured person only if it is safe to do so.
- Do not attempt to restart or move the mechanism.
- Report the incident to the lab technician immediately.
- Seek first aid or emergency medical assistance if required.

Electrical faults

- Immediately press the emergency stop button.
- Disconnect the main power supply if safe to do so.
- Do not touch potentially live or damaged components.
- Inform the lab technician immediately.
- Do not operate the rig until it has been inspected and deemed safe.

Fire

- Press the emergency stop button.
- Isolate the power supply if safe to do so.
- Raise the alarm and alert others in the laboratory.
- Activate the nearest fire alarm if required.
- Evacuate immediately via the nearest safe exit.
- Proceed to the designated assembly point.
- Do not re-enter the lab/building until authorised.