Commissioning of Subsea Hydraulic Systems

Poor preparation and processes at start-up/ commissioning can result in damage to hydraulic components. This damage can be catastrophic at start-up, or may not become apparent until many years later. Damage can be prevented by:

**SUBSEA CONTROL SYSTEMS**
- **Flushing**
  - Hygienic assembly practices
  - Flushing at a sufficient pressure and flow rate to ensure turbulent flow is achieved
- **Testing**
  - Confirm fluid cleanliness via patch test kit
  - Remove sensitive equipment prior to flushing
  - Loop hoses to reduce flushing time
  - Use non-bypass filters

**COMPONENT CONSIDERATIONS**
- **Pipework**
  - Cleanliness during manufacture is critical
- **Hoses**
  - Pig hoses before end fittings are applied
  - Installation is critical (abrasion/ kinking/ environmental issues)
- **Accumulators**
  - Store with partial fill
  - Charge gas slowly
- **Pumps & Motors**
  - Pre-charge/ bleed to provide adequate lubrication
  - Ensure motor case is full
  - Perform rotation checks with no load
- **Cylinders**
  - Ensure system is fully bled
- **Regulators**
  - Screw down to near maximum pressure
  - Prime at a low pressure
  - Cycle to check repeatability
- **Pressure Relief Valves**
  - Remove from systems during flushing and testing
  - Set and certify off-line

**START-UP RISK REDUCTION**
- **Initial build cleanliness**
- **Factory Acceptance Testing (FAT)**
  - Individual component is tested
- **System Integrity Testing (SIT)**
  - Full stack up testing
- **Pre-Commissioning**
  - Checks on all components off line

**Fluid Cleanliness is the key to success**