

# Typical annual testing schedules for Hydroelectric flow control equipment

(In addition to the annual testing given below, the equipment shall also undergo periodic full scale testing, usually every 5 to 10 years)

## Sluice Gate Inspection and Testing

All sluice gates shall be inspected and tested every year. The gate will be opened 10% then closed, preferably at a high headwater level.

- Tests shall be conducted using both local and remote control and automatic operation, if provided. However a gate does not have to be tested more than once. At multi gate sites, the first gate could be tested using local control, the second with remote control, and the third with backup power, etc. For single gate sites, up travel could be local control and down travel remote control.
- The operation of remote gate position indication shall be verified.
- Tests shall be conducted using both the normal and back-up power supplies.

## Dam discharge valves inspection and testing

Dam Discharge valves shall be inspected and tested annually

- Discharge valves shall be visually inspected as much as is possible without dewatering them.
- Discharge valves such as butterfly or gate types shall be tested by fully opening then closing them.
- If the valve has unknown or suspect operating capability an engineer must review and approve the test procedure.

## Headgates and inlet valves inspection and testing

The headgates and inlet valves will be inspected annually using check sheets based on the examples given in Appendix 1 or using equivalent ones developed locally.

The following test program will be carried out on all headgates and inlet valves.

- Full load closure test for all units every two years
- OR
- Full load closure test every 4 years for all units and,

- Prime then release test every year for all units

The testing and reporting procedures are given below. These tests can be modified to suit individual station situations, however the Manager must be satisfied that all public safety issues and equipment safety issues have been addressed. The reasons for modifying any of the test requirements will be documented.

Station specific issues:

- Testing can be modified if the headgates have recently been refurbished.
- At some small stations the testing can be modified to suit the local situation. For instance:
  - At some stations the headgates may have only manual closure
  - One headgate may serve several units
  - Some gates are not designed to close under flow and have to be jacked down.
  - The penstock condition may be questionable
- If there is any concern over the condition of the equipment it will be inspected before the test.

Sample check sheet

## Annual Sluice gate inspection and maintenance-Mechanical

Dam Name: \_\_\_\_\_ PM Order Number: \_\_\_\_\_

- Notes:
1. Complete all areas in pen.
  2. √ = no follow-up or corrective action required.
  3. X = follow-up or corrective action required. Give details in Remarks.

INSPECTED BY (Print): \_\_\_\_\_ (Sign) \_\_\_\_\_ (Date) \_\_\_\_\_

REVIEWED BY (Print): \_\_\_\_\_ (Sign) \_\_\_\_\_ (Date) \_\_\_\_\_

Sluice gate inspection-mechanical			
	Item	Completed	Remarks Trouble found or extra work required; (Follow up order number)
<b>1.0</b>	<b>Hoist gear box</b>		
	Check oil level		
	Check for water in oil		
	Check for oil leakage from seals or covers		
	Visually inspect gear condition (remove covers)		
	Check security of hold down bolts on gearbox		
	Check drive coupling for wear and lubricate		
<b>2.0</b>	<b>HOIST (cable type)</b>		
	Inspect fan brake		
	Check hoist brake setting & record. Adjust if required.		
	Check brake pad condition and record thickness		
	Lubricate brake linkages & pins		
	Check condition of brake drum		
	Verify hoist brake operates correctly		
	Inspect open gears		
	Lubricate open gears (all weather lubricant)		
	Inspect and lubricate telemeter gear/chain		
	Inspect security of bolts		
	Inspect wire rope. Lubricate if scheduled		
	Inspect hoist drum. Check cable clamp is secure		
	Lubricate hoist drum bearings		
	Inspect and lubricate standing block/sheaves		
	Lubricate pedestal bearings.		

<b>Sluice gate inspection-mechanical</b>			
	<b>Item</b>	<b>Completed</b>	<b>Remarks</b> Trouble found or extra work required; (Follow up order number)
	Check security of bolts on pedestal bearings		
	Inspect/operate and lubricate extreme mech. upper limit switch		
	Inspect and lubricate running block sheaves		
	Inspect & lubricate slack wire rope indicator		
	Check that cables are slack when gate is down		
	Wipe up excessive oil & grease		
	Inspect hoist house condition		
<b>3.0</b>	<b>HOIST (screw type)</b>		
	Lubricate horizontal drive shaft pillow blocks		
	Check gate screw right angle gear box housing for oil leaks and cracks		
	Check for water inside screw gear box		
	Lubricate the screw box gears		
	Check condition of accordion cover for screws		
	Every two years remove old grease and re-lubricate hoist screws		
<b>4.0</b>	<b>GATE</b>		
	Inspect wheels for signs of non rotation		
	Lubricate wheel bearings		
	Check that side rollers operate freely and are not damaged		
	Lubricate side rollers		
	Check for damaged grease lines		
	Check operation of gate heater and thermostats		
	Inspect gate seals and seal surfaces for leaks and damage		
	Inspect cladding		
	Check proper operation of bubbler system. Look for water leaks at skin plate connection. Change compressor oil.		
	Inspect inside gate for leakage, skin plate deformation , corrosion		
<b>5.0</b>	<b>GENERAL</b>		
	Check condition and operation of dogging		

<b>Sluice gate inspection-mechanical</b>			
	<b>Item</b>	<b>Completed</b>	<b>Remarks</b> Trouble found or extra work required; (Follow up order number)
	mechanisms. Ensure they are locked out		
	Check condition of main hoist structure for deformation and corrosion		
	Check condition of gate height gauge		
	Touch up paint as required		
	Fill in Log Book at site		