

Contents

	Foreword
	Introduction
1	Scope
2	Normative references
3	Terms and definitions
4	Hydrology
4.1	Basic data
4.2	Runoff (discharge)
4.3	Flood
4.4	Stage-discharge relation curve
4.5	Sediment, evaporation, ice regime and others
4.6	Rationality check of the outcomes
5	Engineering geology
5.1	General provisions
5.2	Regional geology
5.3	Engineering geology of the reservoir area
5.4	Engineering geology of hydraulic structures
5.5	Natural construction material
6	Hydraulic engineering and energy calculation
6.1	General provisions
6.2	Computation of runoff regulation
6.3	Hydraulic energy calculation
6.4	Load forecast and electric power and energy balance
6.5	Selection of flood regulation and characteristic flood-control level
6.6	Selection of normal water level and dead storage water level
6.7	Selection of installed capacity and type of unit
6.8	Selection of dimensions of headrace and volume of daily regulation pool
6.9	Analysis of the reservoir sediment deposition and calculation of the backwater
6.10	Reservoir operation mode and operational characteristics
7	Engineering layout and hydraulic structure
7.1	General provisions
7.2	General engineering layout
7.3	Water retaining structure
7.4	Water release structure
7.5	Water diversion structure
7.6	Powerhouse structure
7.7	Engineering safety monitoring
7.8	Concrete strength and durability
8	Hydraulic machinery, fire protection, heating and ventilation
8.1	General requirements for selection of turbine and generator
8.2	Selection of turbine rated head
8.3	Selection of turbine type
8.4	Selection of basic parameters of the reaction turbine
8.5	Selection of basic parameters of the impulse turbine

- 8.6 Unit transient performance analysis
- 8.7 Turbine governing system
- 8.8 Turbine main inlet valve
- 8.9 Cooling water and drainage system
- 8.10 Oil system
- 8.11 Compressed air system
- 8.12 Hydraulic monitoring system
- 8.13 Selection of lifting equipment
- 8.14 Fire protection
- 8.15 Heating and ventilation
- 8.16 Repair and maintenance equipment
- 8.17 Arrangement of hydraulic machinery equipment
- 9 Electrical system
 - 9.1 Connection of the hydropower plant to the power system
 - 9.2 Main electrical connection wiring
 - 9.3 Selection of the main transformer
 - 9.4 Selection of high-voltage electrical equipment
 - 9.5 Overvoltage protection and earthing system
 - 9.6 Lighting system
 - 9.7 Layout of main electrical equipment inside and outside the power plant
 - 9.8 Relaying protection and security automatic equipment
 - 9.9 Excitation system
 - 9.10 Automatic monitoring system
 - 9.11 Plant service power supply and dam area power supply
 - 9.12 DC operating power supply
 - 9.13 Video monitoring system
 - 9.14 Communication
- 10 Hydro mechanical structure
 - 10.1 General provisions
 - 10.2 Arrangement of hydro mechanical structure
 - 10.3 Hoist selection for gates
 - 10.4 Gate structure design
 - 10.5 Anti-corrosion of hydro mechanical structures
- 11 Guidelines for construction planning
 - 11.1 Construction diversion
 - 11.2 Selection, planning and exploitation of the borrow area
 - 11.3 Construction of the main works
 - 11.4 Construction planning of roads and transportation
 - 11.5 Construction plant facilities
 - 11.6 Construction general layout
 - 11.7 Overall construction programme
 - 11.8 Construction safety
- 12 Social and environmental impact assessment
 - 12.1 General provisions
 - 12.2 Environmental impact assessment
 - 12.3 Land acquisition and resettlement
 - 12.4 Soil and water conservation
 - 12.5 Social impact assessment
 - 12.6 Conclusion of assessment and advice
- 13 Project cost estimates
 - 13.1 General provisions
 - 13.2 Project division
 - 13.3 Costs and unit price
 - 13.4 Engineering budget preparation
 - 13.5 Composition of cost estimate documents
- 14 Economic appraisal
 - 14.1 General provisions
 - 14.2 Cost calculation

- 14.3 Benefits calculation
- 14.4 Economic cost benefit evaluation
- 14.5 Financial evaluation
- 14.6 Uncertainty analysis
- 14.7 Methods of scheme comparison

Annex A (informative) Workshop contributors

Page count: 80