

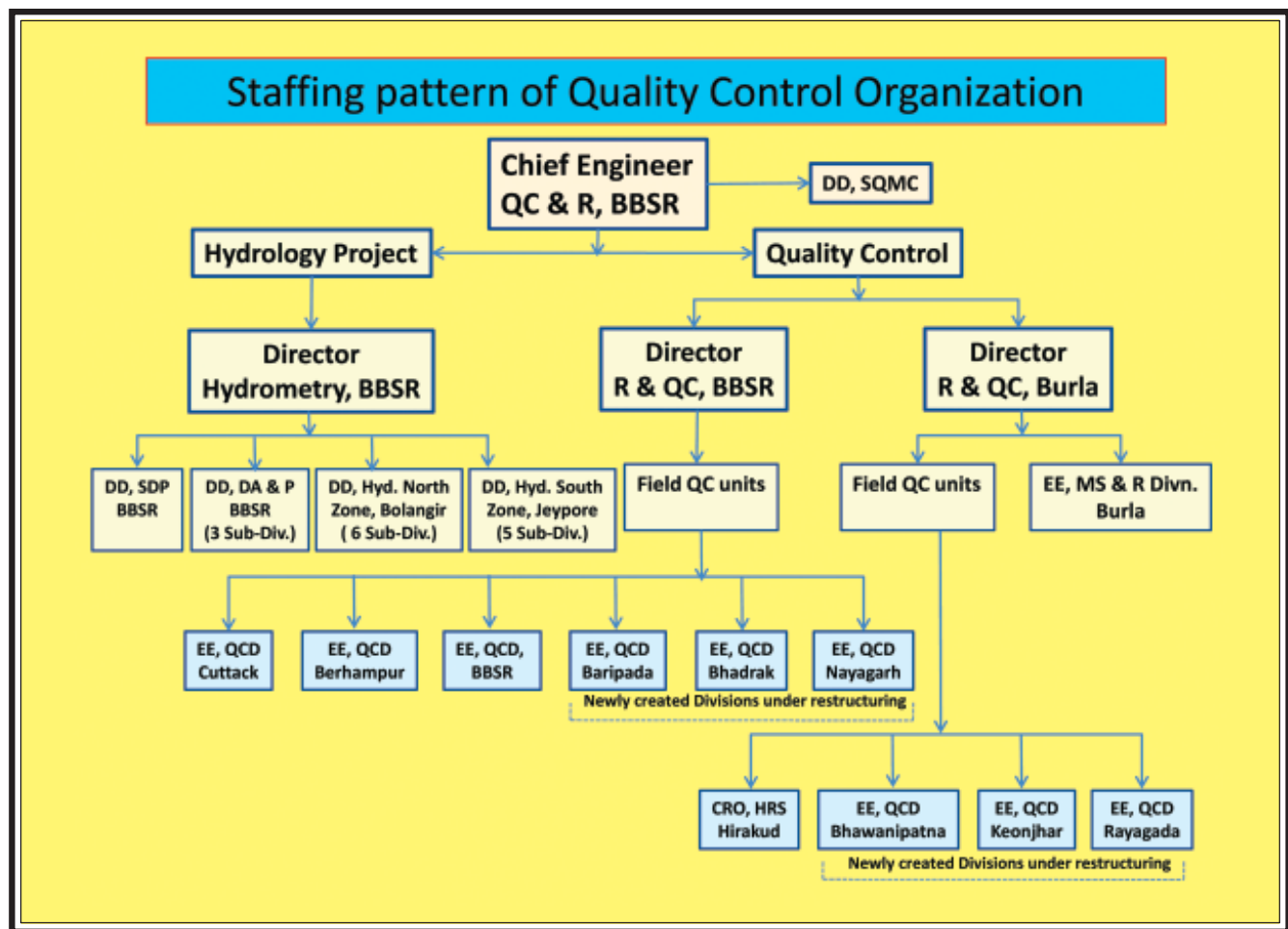
Quality Control & Quality Assurance

Organizational Setup

The Chief Engineer, Quality Control & Research with its headquarters at Bhubaneswar is looking after the works of the following two aspects

of Water Resources Department. QC & A by the Implementing Agency.

1. Quality Control and Research
2. Hydrometry (Surface Water)



Quality Control

The Quality Control Organisation functions with two Directorates and ten territorial Quality Control Divisions to look after quality control and assurance of different civil construction works under Major, Medium & Minor Irrigation sectors.

One Executive Engineer is exclusively looking after the work of Model Studies for Hydraulic structures.

- Apart from aforesaid setup, another eleven nos. of Quality Control Divisions functioning separately under the administrative and technical control of different project authorities



for looking after Quality Control and Assurance of respective projects.

- Project implementation Authority is responsible for all arrangements that are necessary for quality control measures and quality management. Assurance of quality of the works under execution is the prime responsibility of the concerned field Engineers in charge of construction. Whereas, the Quality Control organisation is assisting the project authority to ensure that different components of Civil Construction works are being executed in accordance with the prescribed codal specifications. In addition to the above, the organisation also suggests possible remedial measures, if warranted, to ensure execution of works in line with the drawings and specifications.

Activities

1. Inspection of construction works at different locations from quality assurance point of view, collect samples for testing in the departmental laboratory and conduct field tests and certify suitability of materials for use in different works.
2. Conduct different tests on construction materials and finished items of work in the departmental laboratory, carry out analysis and communicate test results and findings to the project authorities.
3. Formulating design mix for different grades of concrete in the departmental laboratory.
4. Conduct quality control audit of all the works carried out by each division at post construction stage during monsoon season by constituting technical teams.
5. Imparting training to the field level officers to make them well conversant in carrying out the field level testing.
6. Accompany State Quality Monitors (SQMs) during their field visit.
7. Conducting physical model studies for different water resources structures prior to their implementation to verify its operational hydraulic behaviour at post construction stage and communicate the test results to the design organisation, which in turn enables the designer to check as to whether the test results corroborating the design consideration, needs revision of design and drawing based on the findings of the model studies.

Test Conducted in Laboratories.

A. Concrete Section.

1. Cement

- a. Consistency
- b. Fineness
- c. Initial Setting time.
- d. Final Setting Time.
- e. Compressive Strength-
 - i. for 3 days
 - ii. for 7 days
 - iii. for 28 days

2. Course Aggregate.

- a. Sieve Analysis
- b. Impact
- c. Elongation
- d. Water Absorption
- e. Flakiness
- f. Specific Gravity
- g. Abrasion

3. Fine Aggregate

- a. Sieve Analysis
- b. Silt and Clay
- c. Specific Gravity
- d. Fineness Modulus

4. Design Mix.

- a. Concrete Cubes :
 - i. for 7 days
 - ii. for 28 days

5. Concrete Cubes of Different Mix.

- i. for 7 days
- ii. for 28 days

**6. Hard Stone & Hard Granite Boulders.**

- a. Abrasion
- b. Water Absorption
- c. Specific Gravity
- d. Soundness
- e. Crushing Strength
- f. Impact Value

B. Soil Section.**1. Soil**

- a. Proctor Compaction
- b. Liquid Limit
- c. Plastic Limit
- d. Dry Density
- e. Moisture Content
- f. Bulk Density (in situ)
- g. Grain Size Analysis
- h. Permeability
- i. Specific Gravity
- j. Swelling Pressure
- k. Triaxial Shear Test (R)
- l. Triaxial Shear Test (Q)
- m. Mechanical Analysis

2. Moorum

- a. Gradation
- b. Liquid Limit
- c. Plastic Limit

3. Bricks

- a. Water Absorption
- b. Compressive Strength

C. Steel.

- a. Unit Weight
- b. Elongation
- c. Ultimate tensile strength
- d. Dimensional tolerance

D. Chemical.

- a. pH value
- b. F.I. conductivity
- c. Total dissolved solid
- d. Phenolph Alkalinity
- e. Hydroxyl (OH₂)
- f. Carbonate (CO₃)
- g. Bicarbonate (HCO₃)
- h. Chloride (Cl)
- i. Sulphate (SO₄)
- j. Calcium (Ca)
- k. Magnesium (Mg)
- l. Total Hardness
- m. B.O.D

These test facilities are available at Hirakud Research Station, Hirakud.

These test facilities are available at Q.C. Divn., Cuttack.

Status of Revenue collection towards quality control testing charges

(₹in lakhs.)

Sl No.	Name of Divn	2013-14	2014-15	2015-16	2016-17
1	Q.C. Division, BBSR	14.02	9.56	30.55	40.73
2	Q.C. Division, Cuttack	23.15	18.04	29.91	45.52
3	Q.C. Division, Berhampur	34.34	26.59	30.00	50.34
4	Hirakud Research Station	19.21	38.77	59.25	25.60
5	Q.C. Divn., Bhawanipatna	-	-	-	2.66
6	Q.C. Division, Rayagada	-	-	-	1.30
	Total	90.72	92.96	149.71	166.15



Photographs of State Quality Monitors Examining Quality Control Activities



Quality Control



Slump & Cube Testing at Subarnarekha Irrigation Project

Photographs of State Quality Monitors Examining Quality Control Activities



*Testing at
Telengiri Medium Irrigation Project*



*Testing at
Telengiri Medium Irrigation Project*



*Slump & Cube Testing of CC lining of
canal at Subarnarekha Irrigation Project*