

WORK RESPONSIBILITIES OF BARRAGE & CANAL DESIGN DIRECTORATE:

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Introduction:

Central Water Commission (CWC) is a premier Technical Organization of India in the field of Water Resources and is presently functioning as an attached office of the Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India. The Commission is entrusted with the general responsibilities of initiating, coordinating and furthering in consultation of the State Governments concerned, schemes for control, conservation and utilization of water resources throughout the country, for purpose of Flood Control, Irrigation, Navigation, Drinking Water Supply and Water Power Development. It also undertakes the investigations, construction and execution of any such schemes as required.

Central Water Commission is headed by a Chairman, with the status of Ex-Officio Secretary to the Government of India. The work of the Commission is divided among 3 wings namely, Designs and Research (D&R) Wing, River Management (RM) Wing and Water Planning and Projects (WP&P) Wing. Each wing is placed under the charge of a full-time Member with the status of Ex-Officio Additional Secretary to the Government of India and comprising of number of Organizations and Directorates responsible for the disposal of tasks and duties falling within their assigned scope of functions.

My Directorate, Barrage & Canal Design Directorate fall under Designs(N&W) Organization of D&R Wing of CWC. This Directorate deals with the design Consultancy work of water resources projects in various states of North and Western parts of India which include states like Rajasthan,Bihar,Uttar Pradesh, Jharkhand, Chattisgarh, Jammu & Kashmir, Uttarakhand, Gujrat & Madhyapradesh. Further, CWC also provides technical Assistance/Design consultancy to neighbouring countries like Nepal, Afganistan & Bhutan. Over the years due to resistance against buliding larger water retaining structures like DAM's etc. from various sectors of the society and environment, there has been a dramatic shift in focus from DAM's to smaller water retaining cum diversion structures like Barrages and Wiers. Hence this directorate over the years has attained larger significance in the feild of water resources. This report gives a quick overview on the works & Resposibilities of this office which are dealt inbreif in the following chaptes: Chapter (i) Work responsibilities of this office. Chapter (ii) Services being provided by this office to various Organisations ,Public Sector Enterprises & Public at large.

Chapter (iii) Data sources relied on. Chapter (iv) Areas which still need to improve upon.



Fig 1: Typical Barrage cum Bridge.

Chapter 1

Work responsibilities of this office

BCD(Barrage & Canal Design) directorate is one of the directorates of North & West Designs Organization in Design & Research wing of CWC. This chapter gives details of works that are being carried out herewith in this directorate.

1.1 Design consultancy of (a) Construction stage projects (b) DPR(Detailed project report) stage projects.

- (a) ***Construction stage projects***: It envisages providing design and preparation of construction drawings of water resource projects which are categorized as National Projects & State funded projects. These including design flood estimation for various components such as Design flood for water way fixation, design flood for free board of Barrage components, Design flood for protection against scour, Design flood for river diversion works during construction.
- (b) ***DPR(Detailed project report) stage projects***: Works on technical examination of Detailed Project Reports of Major Irrigation Schemes and Hydro Electric Projects . This item of job involves examination of Planning, Design(Hydraulic and Structural), execution and maintenance aspects of Barrages/Weirs, Canals, Cross-Drainage(CD) and Cross-Communication(CM) works of project reports.

1.2 Technical studies/ Guidelines Preparation:

This directorate prepared various guidelines for Planning and design of Barrages, Canals and CD&CM works became very useful for various central and State organizations. Recent guidelines prepared by this directorate is on “Piped Irrigation Network-Guide Lines for Planning and Design” which primarily intends to gradually shift from current open canal system which is widely practised in india to closed or piped network canal system.

1.3 BIS (IS Code) Works:

BIS Draft ammendments to codes for finalization/consideration Codes for indian Standard on Canals and Cross Drainage Works

Terminology Involved:

Weir: A weir is an impervious barrier with raised crest of 1-3 m constructed across a river to raise the water level on the upstream side (Fig a).



(a)



(b)

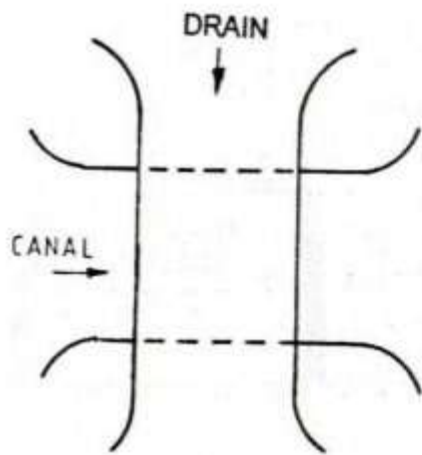
Fig: (a)Weir (b) Barrage

Barrage: A barrage is a weir that has adjustable gates installed over top of it, to allow different water surface heights at different times. Generally barrages will have its crest at average bed level (fig b).

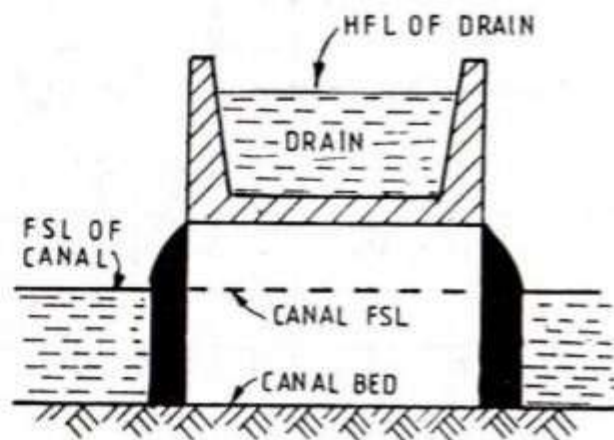
Dam: A dam is a high impervious barrier constructed across a river valley to form a deep storage reservoir (fig c)



Fig (c) Gravity Dam



Drain taken over the canal in a Superpassage or in a Syphon.
(Line Plan of Crossing)



Typical cross-section of a Superpassage.

(b)

(b) CD-Works

CD- Works: (Cross Drainage works) is a structure constructed when there is a crossing of canal and natural drain, to prevent the drain water from mixing into canal water.

Chapter 2

Services being provided by this office

Being part of an apex organisation in water sector this office provides services to various Organisations ,Public Sector Enterprises & Public at large as mentioned:

1. **Other Organisations:** Training to other organisations like state depts.
 2. BIS Code works.
- b) **PSE's:** Consultancy DPR's examination NWDA, WAPCOS, NHPC, NTPC etc.
- c) **Public services** include the following:
3. RTI's : Applications recieved under RTI act-2005 are dispensed with addressing and timely redressal of queries raised.
 4. VIP References/Parliamentary questions: Dispensing information related to water sector by concerned representatives of states for
 5. Training to intern students

Chapter 3

Data sources relied on

This directorate examines Detailed Project Report of water resource projects for technical aspects on design of Barrages/canals/ CD works etc. Which inturn is based on the data obtained from feild locations through various surveys coducted by project authorties. For an economical and satisfactory design proer feild investigation have to be carried out and necessary data has to be collected in an organized manner. Followings data has to be obtained at Prelimenary stage (Prelimenary investigation) & Detailed project stage(deatiled inetigation).

At preliminary investiagtion satge

Chapter 4

Areas which still need to improve upon

1. **Software based designs:** Design works being carried out in this directorate are based on manual analysis done in excel sheet(s), this practice has to be shifted to numerical analysis/ Finite element based softwares to get a more efficient and robust design results .
2. **Skill development:** Training in softwares (theoretical & practical) has to be imparted along with regular discussion sessions with peer groups of various organisations. and hands on practice in FEM related S/W and hands on training)
3. Staff strength
4. Skill devlop. : A

I. **Technical studies/Special problems:**

1. The work of “Assessment of available waters of eastern rivers of Indus system and their optimal utilization” was entrusted to a committee. The team visited projects on Ravi and Sutlej rivers and submitted the report proposing construction of two barrages on river Ravi for optimal utilization of waters.
2. The work of preparation of DPR for “ Mitigation of floods in River Jhelum” was entrusted to a committee formed during the year. A mathematical model was proposed and based on the results, the DPR is being prepared by CWC proposing work such as dredging of river Jhelum in certain reaches and raising of banks of river Jhelum.
3. A team visited the western Jammu canal system for studying and to find out an engineering solution of supply of Rajasthan’s share, Ex-Tajewala headworks and submitted report proposing laying a pipe system from Khubru headworks.
4. The proposal of providing longitudinal connectivity of river at Jhelum Tamak HEP Site was examined with respect to its engineering planning and design aspect and suitable modifications have been offered to the project authorities.

II. **BIS Works:**

1. WRD-13 Canals and Cross Drainage Works Sectional Committee, Eighteenth meeting, was held during 30.09.16. Draft amendments to codes for finalization/consideration in 5 different codes were discussed /confirmed.

III. **Committees / Boards:**

1. Committee for preparation of DPR of comprehensive flood plan for Jhelum and its tributaries Phase-II.
2. A Committee was formed on Assessment of available waters of eastern rivers of Indus system and their optimal utilization.

Chapter 5

Conclusions

- The international training is very useful for estimation of design flood for design of barrages canals and cross drainage works and cross-communications works.
- Canal alignment crosses many streams where CD Structures are constructed. These drainages small and big generally less gauged. In all such cases, the Unit Hydrograph Theory and Streamflow Routing and Flood Frequency Analysis modules: International Edition are very useful in estimation of design flood for such catchments and structure.
- The ASMET: 2009 Drought in East Africa module is very useful in understanding monsoon system in Indian Ocean, Elnino and Laninos.
- Through Flood Forecasting Case Study: International Edition, I gained the importance of flash flood forecast of urban centers.