

CHAPTER 20

COMPUTER PROGRAMS

Contents

Section	Title	Page
20-01	Introduction	1
20-02	Installation Description	1
20-03	Computer Programs	1

COMPUTER PROGRAMS

INTRODUCTION:

The design process today requires large amount of information that must be collected, sorted, stored, organized in logical form, processed and retrieved in a presentable manner. Engineering computations require a great amount of data handling, mathematical operations and graphical representations which may be extremely difficult to do without the aid of a powerful computer.

To implement the manipulation of respective computations there are other advantages obtained through the use of computers such as:

- 1) The use of powerful programs which assist in the solution of specific problems.
- 2) Ability to create files for the storage and manipulation of specific project data.
- 3) The capacity of preparing graphic representations through the use of a plotter.
- 4) Rapid exchange of information is possible through the use of telecommunications network.
- 5) The use of interactive communications on rented time makes possible for government agencies and private offices to have access to a powerful tool for a very economical cost.

INSTALLATION DESCRIPTION

The Puerto Rico Highway Authority Information and System Center operates a powerful computer facility designed to handle scientific, engineering, mathematical, and commercial applications for the various Departments, Agencies and Public Corporations of the Commonwealth of Puerto Rico and for Private Users too. This Center operates very much like a Service Bureau, located in the basement of the Minillas South Building at Santurce, Puerto Rico.

The Information and System Center is equipped with an Honeywell-Multic 68 level computer with two (2) million of real core capacity and virtual storage. The Center also maintains magnetic tape equipment, direct access external storage devices, card readers and punches, high speed printers, and teleprocessing equipment. The Center operates Multics interactive mode, an innovation in computer technology that refers to the simultaneous utilization of the computer system by multiple users operating in real time, conversational mode.

More information can be obtained from the Operational Systems Office with the telephone number 726-6840.

COMPUTER PROGRAMS

In order to have an effective control of the expenditure of the Department of Transportation and Public Works resources in the design and construction of transportation facilities. The designer must become familiar with available computer programs. The following computer program descriptions are published for the guidance of the designers.

PROGRAM	DESCRIPTION	STATUS	REMARKS
ELOISA	Snyder method for hydrologic computations.	Operational	Developed by Engineer Martínez Alfonso
PREST	Pre-stressed structures	Operational	Adapted from a Portland Cement Association Program
TABS	Structural dynamic analysis	Operational	Developed by the University of California
BACKWTR	Stage elevations of water surface.	Operational	Developed by the Federal Highway Administration
HEC 1	Watershed hydrologic calculation using various convenient options.	Operational	Developed by the U.S. Corps of Engineers
HEC 2	Water surface profiles for critical and supercritical flows.	Operational	Developed by the U.S. Corps of Engineers
TR20	Watershed hydrologic calculations using various options.	Operational	Developed by the U.S. Soil Conservation Service
WSP2	Water surface profiles (subcritical flow).	Operational	Developed by the U.S. Soil Conservation Service
MITCAT	Catchment model —a very wide scope package with numerous convenient options as routing through lakes and pipes.	Operational	Developed by M.I.T.
COGO	For the solution of civil engineering geometric problems which entail manipulating such objects as points, lines, curves, alignments, traverses, profiles and general chain like objects.	Operational	Honeywell AH94-A, Rev. 1
STRESS	For the solution of structural engineering problems. May be used to perform preliminary and exact analysis of two or three dimensional framed structures. Members and joints may be rigidly connected or pinned.	Operational	
RDS	Roadway analysis and design systems used in the solution of problems involving the location and design of almost any type of roadway. The basic system framework and a majority of the computer routines are applicable to	Operational	Federal Highway Administration

PROGRAM	DESCRIPTION	STATUS	REMARKS
	a wide range of civil engineering problems requiring the excavation and embankment of materials, including railroads, waterways, and dykes.		
PMCS	Project Engineering Control for assisting in project planning and control in two major areas: (1) Scheduling via network and extranetwork representation and (2) Information handling for cost and resources projections for cost and progress reporting.	Operational	Honeywell: Project Management and Control System. DD59 Rev. 0
JSLAB	Analysis and design of concrete slab bridge in tabulated form.	Operational	Developed by Engineer Jorge Acevedo
ABEAM	Analysis and design of post-tensioned AASHTO Beam according with standard specifications for Highway Bridges adopted by the American Association of State Highway and Transportation Officials, tenth edition, 1969.	Operational	Developed by Engineer Jorge Acevedo
AASHBEAM	Analysis and design of post-tensioned AASHTO Beam according with standard specifications for highway bridges adopted by the American Association of State Highway and Transportation Officials, eleventh edition, 1973.	Operational	
OPTIBEAM	Optimization of Post-Tensioned AASHTO Beam according with standard specifications for highway bridges adopted by the American Association of State Highway and Transportation Officials, eleventh edition, 1973 (Research).	Operational	Developed by Engineer Jorge Acevedo
HYDRA	Hydraulics computations of bridge waterways for subcritical and super-criticals flows, determining back water, embankment protection, spur dike necessity and expected scouring for piers and abutments.	Operational	Developed by Engineer Jorge Acevedo

PROGRAM	DESCRIPTION	STATUS	REMARKS
ASHOBM 75	Analysis and design of post-tensioned AASHTO Beam according with standard specifications for highway bridges adopted by the American Association of State Highway and Transportation Officials, Interim Specification 1975.	Testing Process	Developed by Engineer Jorge Acevedo
DISWATER	Hydrologic computations for small watershed to Puerto Rico.	Operational	Developed by Engineer Juan Virella
PILAPENA	Computer design of wall piers	Testing Process	Developed by Engineer Alejandro de la Peña
JOSE	Analysis and design of Cantilever Slab over AASHTO Beams.	Testing Process	Developed by Engineer José Caballero
BROWN	Hydraulic analysis including backwater for bridge waterway.	Operational	Adapted from Federal Highway Administration
CONBEAM	Analysis and design of continuous beams.	Operational	Adapted from Dept. of Transportation of California
PREBEAM	Analysis and design of Pre-tensioned beams.	Operational	Adapted from Dept. of Transportation of Texas.
OMNITAB	Program for statistical and Numerical Analysis. Consist of over 100 subroutines written in FORTRAN Language.	Implementation Process	Developed by the I O W A State University.
BMD	Biomedical Computer Program (X--Series Supplement) perform data processing and statistical tasks.	Implementation Process	Developed by the University of California.
ECASYM	Solution of system of equations.	Operational	Developed by Engineer Martínez Alfonso
SPSS	Statistical Package for the Social Sciences.	Operational	Reference: SPSS Manual 2nd. Edition Norman H. Nie
TSS	Multics time sharing system library. The TSS library system contains several object subprogram that can be use to solve problem in areas like mathematics, statistics, optimization, geometric on plotting.	Operational	Reference: Multics TSS library user's guide.

PROGRAM	DESCRIPTION	STATUS	REMARKS
EVACOST	Statistical studies of unit price for items involving in highway project.	Operational	Developed by Engineer Jorge Acevedo.
ESTADO	Computer monthly report for projects developed by Structural Design Office.	Operational	Developed by Engineer Jorge Acevedo.
TABLAS	Computer monthly report for projects developed by Structural Design Office in tabulated form.	Operational	Developed by Engineer Jorge Acevedo.
ESTUCAM	Computer monthly report for projects in process by Field Study Office.	Operational	Developed by Engineer Jorge Acevedo.
ACTPLAN	Computer report for projects in base Action Plan for the Structural Design Office.	Testing Process	Developed by Engineer Jorge Acevedo.
CALINE 2	Calculates downwinds concentrations of only carbo monoxide (CO) resulting from emission generated on the highway.	Operational	Developed by the California Dept. of Transportation.
NOISE 2	This program computes in a period of time of one (1) hour, the noise levels L(10) and L(50) produced by motors vehicles in highway.	Operational	Developed by Federal Highway Administration.
MOBILE 1	This program computes emissions of pollutants from motor vehicles, factors and methodology promulgated by the United State Environmental protections Agency (EPA).	Operational	