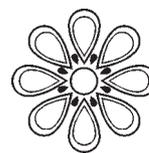




Computer-aided design for rural water supply



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RURAL WATER SUPPLY and sanitation has been given a prominence as a part of Rural Development in India. The IRWSS of Karnataka is to be implemented during 1993-1999 in 1200 villages spread over 12 districts of Karnataka state. The project is being implemented in two phases. The phase I involved 250 villages from 10 districts with ground water source only.

The design and estimation for 250 villages have already been provided and the implementation is in progress.

The preparation of engineering study reports for the project involves the following components:

- Water supply, roads, bylanes, drains, culverts and habitat development.

The activities involved in the computer assisted design of rural water supply scheme is shown in Figure 1 and the detailed activity of project components is shown in Figure 2.

Computers were used in this project for two major applications:

- To establish management information system for effectively managing both the physical and financial aspects of the project.
- To implement design procedures for the design of various elements of water supply and sanitation.

The objectives of the 'Design Module' on the computer are:

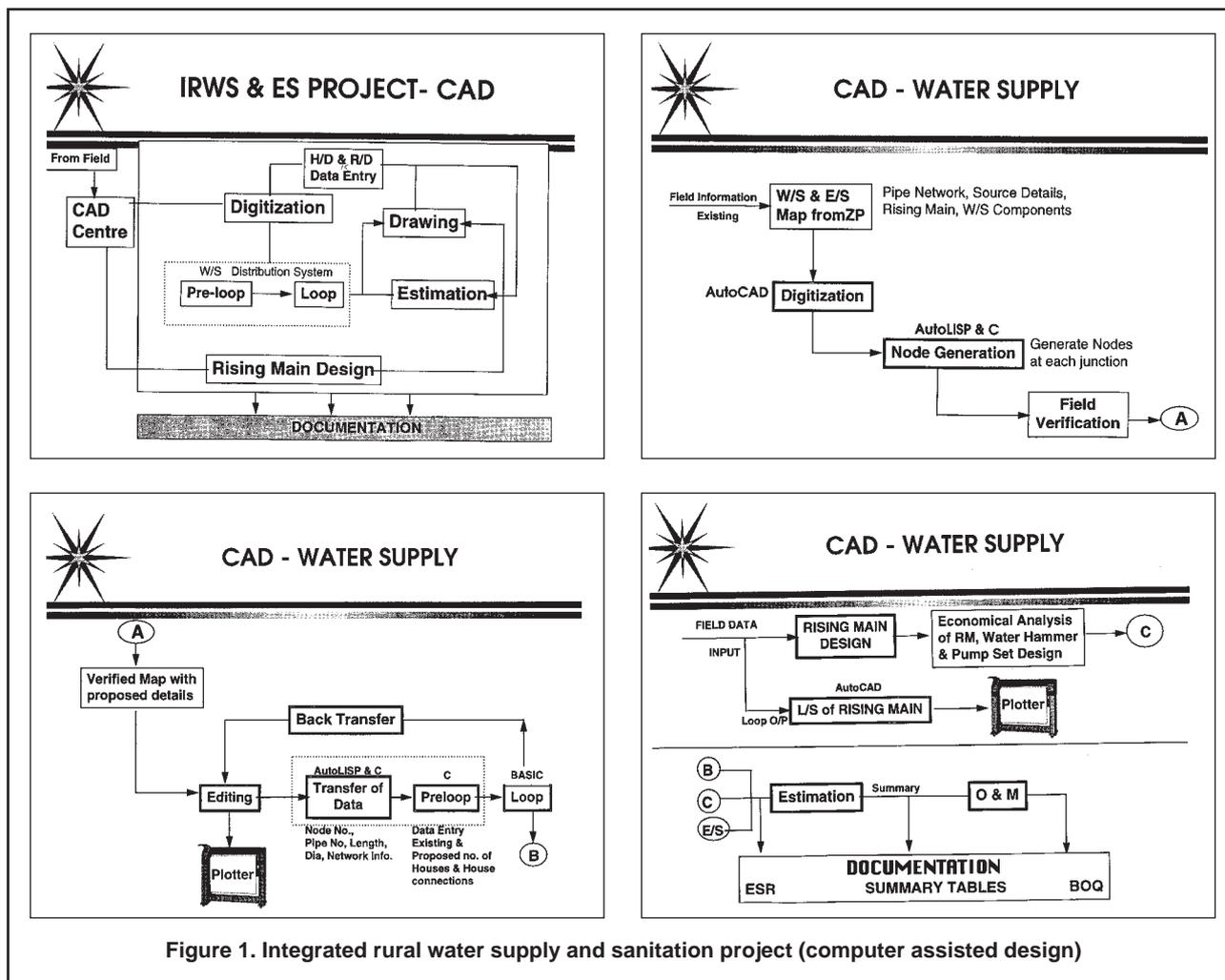


Figure 1. Integrated rural water supply and sanitation project (computer assisted design)

Table 1. List of computing environment utilized for the design of rural water supply systems.

<i>Programs</i>	<i>Objective</i>	<i>Environment Used</i>
1. Node Marking	To generate nodes at each junction point and numbering them	Autolisp & 'C'
2. Population projection	Design population	Basic
3. Water supply data transfer	To transfer the node number, pipe number, pipe length and network information	Autolisp & 'C'
4. Field Data Entry & Validation	To enter the water supply field data and validate them	'C'
5. Preloop	To calculate the cumulative flow and initial estimate of dia of each pipe and nodal discharge for LOOP.	'C'
6. Loop (UNDP World Bank)	Calculates final dia, pressure, inflow and outflow at each node	Basic
7. Data Transfer back to Map	To transfer the various details of nodes and pipes from loop and and preloop output.	Autolisp & 'C'
8. Rising Main	To design the economical section of rising main, pumpset and water hammer.	Dbase III Plus
9. L-Section of Rising Main	To locate the valves in rising main.	Autolisp
10. Selection of water supply	To calculate water requirement for design by selecting combination of various sources.	Dbase III Plus
11. Estimation	Estimation of all the components of water supply, roads, drains and habitat development.	Dbase III Plus
12. Summary tables	Summary of existing and proposed facilities, costs.	Clipper
13. Bill of quantities	Quantities for 18 slices for tendering (water supply components plus washing platforms, cattle troughs and dustbins.	Clipper

- Deriving required and relevant data automatically from the established databases and from the digitised maps.
- Executing the design procedures implemented in software, accurately and consistently.
- To print a variety of reports enumerating the design details.
- Automatically depicting the results of design on the digitised maps.
- To automatically prepare estimates of costs, quantities etc.,
- To simplify and to a large extent automate the process of preparation of project reports.

Benefits of this approach

- On the basis of interaction with user, beneficiary and field data rapid updates without redoing is possible leading to more user friendly designs.
- Large volume of diverse data ranging from geographical, expected expansion, present situation with which an optimized solution can be arrived at is feasible.
- Helps in rapid proto-typing and interactive approaches to design, which otherwise is not possible or time consuming and cost in-effective.

- * For the generation of accurate and detailed estimate for material, labour etc., can be done inspite of wide range of quality and costs.
- When large number of villages are involved this helps in preparing a comprehensive picture by developing a summary table of various components of rural water supply and sanitation in the given project.

Further our experience on this suggest that instead of few stand alone systems a network environment with file server support with graphic support would be an asset for this type of work.

References

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