ES3.
MODIFICATION OF DESIGN FACTORS IN WATER DISTRIBUTION NETWORK DESIGN

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The peak value for water supply is defined as the ratio between "Maximum demand" for a period and "Average demand" for the same period. In a water distribution system, the network design cannot be made for the average values, because then the peak demands cannot be supplied. Hence the highest peak value is what is used for the design. While this parameter ensures a reliable service for the consumers in any service system, having unnecessarily large peak values will raise the project costs by many times. Considering that annually more than 2 billion rupees are spent on water distribution systems in Sri Lanka alone, picking an optimal value for the peak factor is of national importance.

In a Water Supply System (WSS) the water demand varies with time. This temporal variation depends on seasonal climatic changes, socio-cultural factors, regional changes etc.

In Sri Lanka at present, WSS are designed for a peak factor of 2.5 ~ 3.0. The research described in this extended summary was carried out to determine the existing peak factors of Water Supply Systems, which are already in operation 24 hours a day. For this purpose two urban and semi urban WSS namely Hanthana and Eriyagama, located in the Kandy district were studied. Round the clock flow measurements were done at reservoir outlets for Hanthana and Eriyagama. The Socio-Economic Survey was conducted for the two areas in February 1999.

Analyzing above two sets of data, it was observed that maximum peak factor at Hanthana is 2.17 and it occurs at 18:30 hrs (6:30 p.m). For Eriyagama the peak factor is 1.5 and it occurred at 07:15 hrs. This result confirms that the value of 2.5 used in the network design is not the maximum peak during operation. In other words the system have been over-designed, causing a financial loss. For an economic WSS the design peak value should exist in the system, for a minimum period of 2 hours. Taking this fact and the observed results in to consideration, the peak factor can be brought down to a value of 1.5 for distribution line design in a Water Supply System for areas of similar Socio-Economic background.

The study can be extended to get more reliable result considering regional and seasonal variations in water consumption.