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REAL TIME SCADA MODEL FOR WATER LEAKAGE DETECTION SYSTEM.

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ABSTRACT

Water is the most important natural resources for the human being and the most influence on his life in its various aspects, and with the large scarcity in drinking water experienced by most countries worldwide, the specter of drought and water shortages became overshadows on the most human societies, compounding the aggravate of this problem and its impact on the economic aspects the continued of water loss from distribution networks, which exceeded in some countries more than 40% of the treated water that is pumped to consumption points making this problem takes catastrophic character in some cases, requiring decision-makers take necessary measures to reduce its effects and solve it as soon as possible.

This model covers the problem of water loss in general and the problem of leakage in the distribution networks in particular, with an explanation of its causes and its impact on various aspects of life, This model present an initial perception of an innovative method for real-time leakage detection in water distribution networks depends on the use of SCADA system for providing a real-time pressure measurements at different points on the network and analyze them.
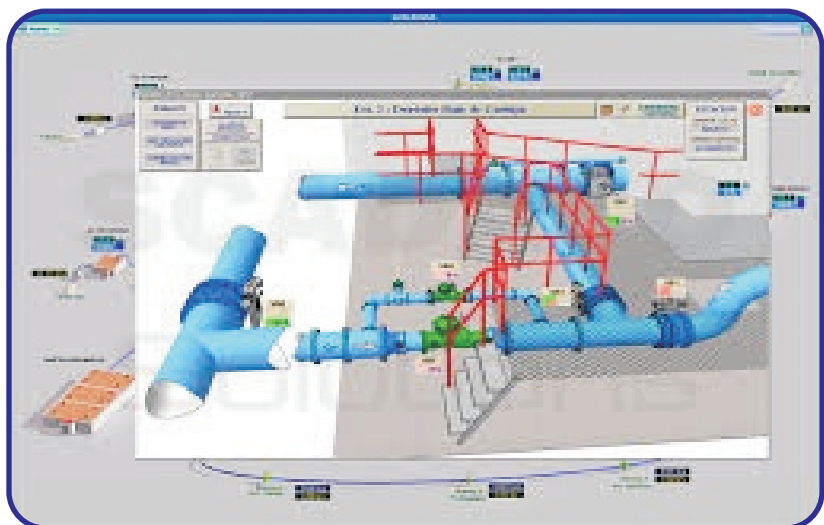
KEYWORDS :SCADA, Unity Pro, Intouch, IO server, SQL Server, Crystal Report.

INTRODUCTION :

Supervisory Control and Data Acquisition (SCADA) is a computerized system widely used primarily for remote control and monitors the status of the field assets from a central location. Field

assets for water supply system including wells, pumping stations, valves, treatment plants and reservoirs. For water distribution network, SCADA system is designed to do the following:

•Monitoring and control the operational processes to ensure get the performance required continually.
•Reduce the levels of dependence on the labor force necessary for the operational processes through automation and operating the system from a central location.
•Store data on the behavior of the system and provide information on the performance of the system through the actions of effective asset management for the system.
• Establish effective operation of the system by reducing the need for routine visits to some remote locations.
•Provide an alarm system that would allow diagnosis of faults remotely from a central location,

WORKING OF MODEL

The main objective of this model is to detect the water leakage. The model consists of ground tank, Tower tank, Pressure meter, flow meter and Pumping motor. The flow meter and pressure meter are connected to ground tank and tower tank. When the Pump is ON the water starts flowing from ground tank to tower tank. For finding the water leakage detection the water volume of outgoing water from ground tank is recorded flow meter and compare with the water volume of receive tower tank. The difference between the two recorded volume is the water leakage.
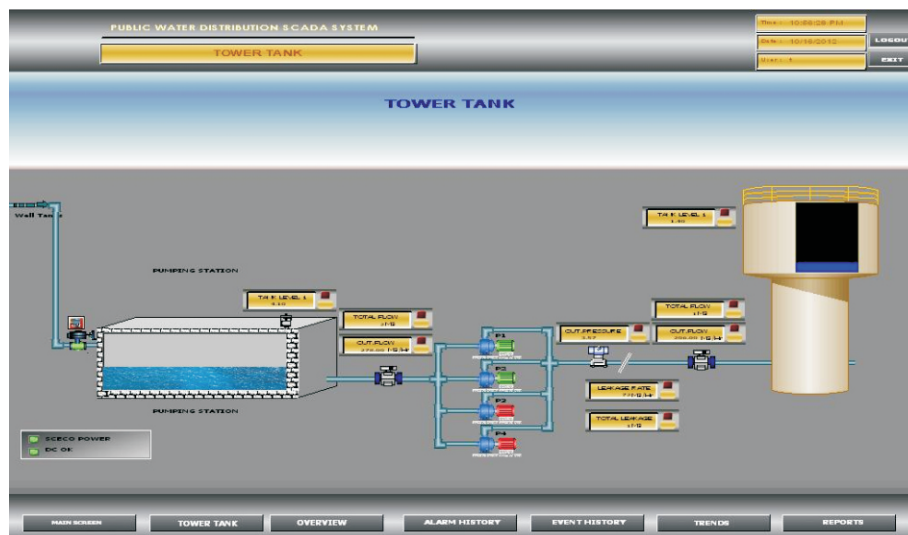
Figure 1 Water Leakage SCADA Screen.

Database (SQL Server 2008)

SQL server 2008 is used as database for recording the water flow. In this model one separate table for leakage is made name as dbo.model3 which has 10 fields
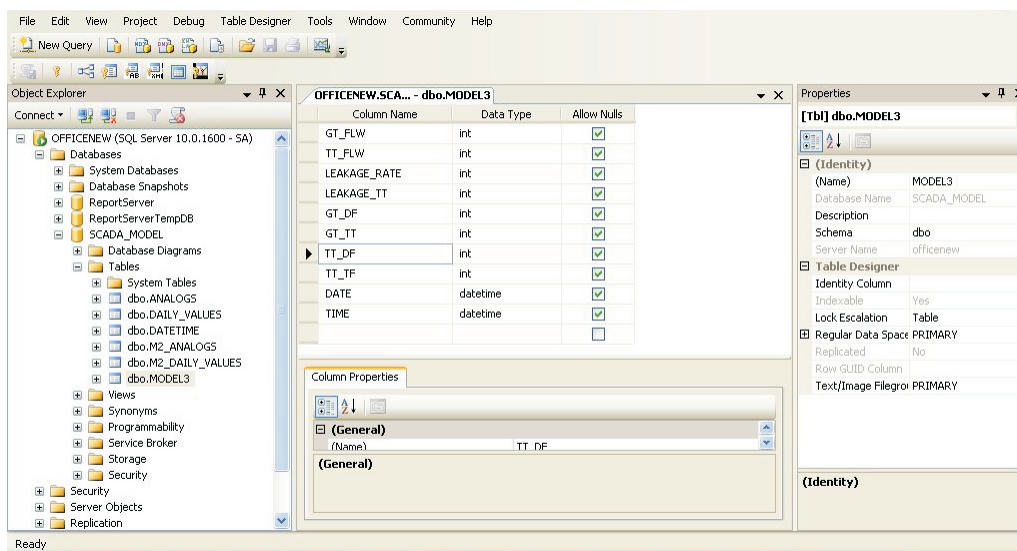
Figure 2 Table dbo.model3(gt_flw,tt_flw,leakage_rate,leakage_tt,gt_of,gt,tt,tt_of,tt_tf,date,time).

Report
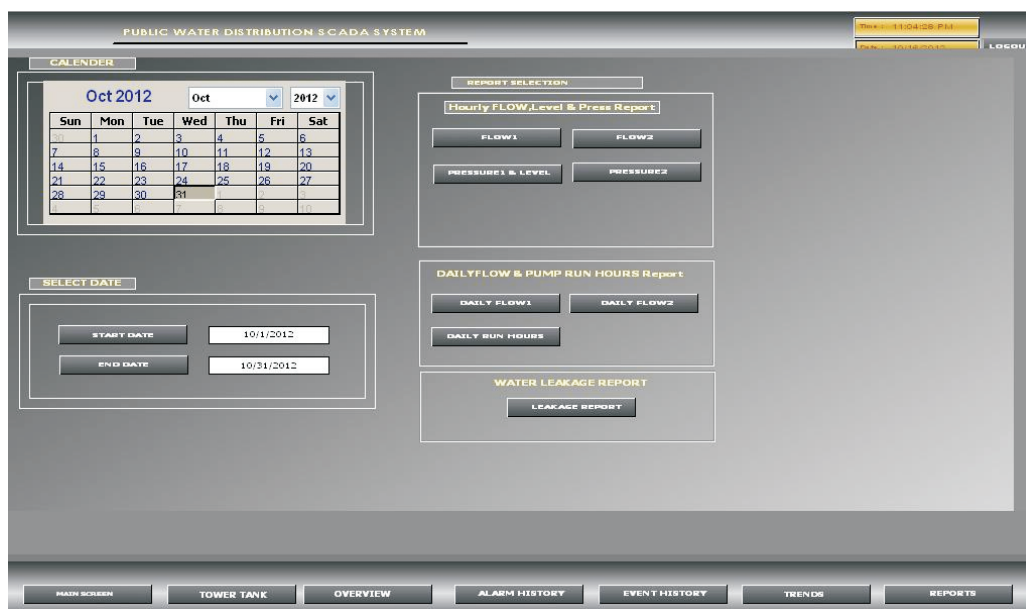
Figure 3 Report selection screen.

Report is selected from report screen. To generate a report of leakage select the start and end date from where the report is require , then click on the button water leakage report which will display the report in crystal report . The report of leakage is recorded every hour which shows the leakage rate per hour and total leakage in million cubic liters.

WATER LEAKAGE REPORT
LEAKAGE WATER DAILY FLOW Reports

Operator : t

StartDate : 10/1/2012 12:00:00AM
EndDate : 10/30/2012 12:00:00AM

| DATE	TIME	DAILY FLOW					
		GT_FLOW (M3/HR)	TWT_FLOW (M3/HR)	GT_TF M3	TWT_TT (M3)	LEAKAGE RATE (M3/HR)	TOTAL LEAKAGE (M3)
14-Oct-2012	2:32 am	282	198	491	307	85	184
14-Oct-2012	2:33 am	334	198	496	310	136	186
14-Oct-2012	2:34 am	385	198	501	313	187	188
14-Oct-2012	2:35 am	295	198	505	316	97	189
14-Oct-2012	2:36 am	346	198	509	318	148	191
14-Oct-2012	3:00 am	317	218	519	325	99	194
14-Oct-2012	4:00 am	287	242	792	495	45	297

Figure 4 Crystal Report of water Leakage

Ladder diagram
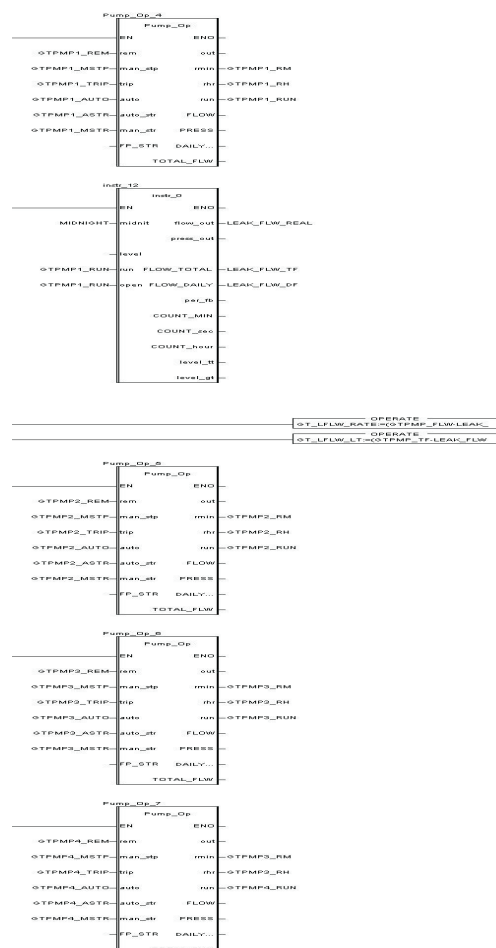
Figure 5 Ladder diagram of water Leakage.

In this model Ladder program are made for tower and ground tank, the ladder program perform the following task..
• Monitoring and controlling pumping motor.
• Simulate the values of flow and pressure once the pumping is ON.
• Record the values of flow and pressure of water for every hour.
• Calculate the difference between the ground flow and tower flow and display the leakage for every hour and the total leakage,
• Reset the values at midnight so that new reading are started from next day.

CONCLUSION

This Model describes a method for the detecting of leakage in a water pipe network by processing pressure values obtained remotely at a number of points in the network using SCADA system. The expected result of this research is find out the ability to predict the leakage size and location in the pipe network depend on pressure and flow rate values obtained in real time by SCADA system.

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