Water Footprint Assessment for Sugar Industry

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Abstract— Water is essential for human being for day to day activities and also required for agriculture and industrial sector for their growth. Water scarcity is major problem of today, thus water footprint is required for domestic and industrial level. The main purpose of water footprint is to find out physical losses and pipe leakages in industry and find out unnecessary use of water. In this paper we discuss about design parameter which are used in practical. We are using v-notch for measuring waste water discharge. There are various devices are available in market like ultrasonic flow meter, clamp on meter etc. by using v-notvh we finding acthual usage of water by industry section wise. Such as milling, boiling, sulphar burner, spray pond etc. there are some limitations of uding ultrasonic flow meter so we are used v-notch. The industrial water is costly as compare to domestic water and also requirement is also high for sugar industry. By using water footprint if we are saving some amount of water which could be economical for sugar industry.

Key words: Water Footprint, Sugar Industry, Green, Blue, Grey Water

I. INTRODUCTION

In world water resources there is 97% of water is unusable for human being and only 3% water is usable. The water footprint is categories in three groups namely as green, blue, gray water. In blue water indicates consumption of surface water and grond resoures the green water is consumption of rain water and gray water is polluted water. The necessity of water footprint is to control unnecessary use of water in sugar industry. The sugar industry used large amount of water and discharge huge amount of effluent into environment. According to CPCB norms aims to bring down the quantity of effluent generated as low as possible. The thame of this paper/project is to reduce unnecessary use of water. Our project implement in karmyogi sugar factory, mahamaphulenagar,bijwadi(indapur).

II. LITERATURE SURVEY

Sadatakaho et.al.(2006) water is indispensable for life. According to japan's stastistics for 2006 approximately 15.7 million m3 of water used for domestic and 12.6 million m3 for industries. Looking at worldwide figures ,as population grow and industries continue develop it is clear that we will require large quantity of water in future. Thus we required accuracy of water withdrawl for manufacturing process.

Emanuele Boanamente et.al. The evaluation procedure was applied to case study and green, blue, grey water volumes are computed. primary data is collected for red wine production by Umbrian wine making company. Results are with average footprint values from literature, showing a total WF of 632.2 L/bottle, with the major contribution(98.3%)given by green water and minor (1.2%and 0.5%)given by grey and blue water, respectively.

K. Drastig et.al.(1999)study of paper calculation of blue water for dairy farming in Brandenburg (germany) is presented. The water is used for milk processing, and servicing of cows over the time of ten years in study. The results of calculation of the direct blue water footprint shows a decreasing water water demand in dairy production in 1999with 5.98*109L/yr to water demand of 5.00*109L/yr in year 2008 in Branden burg because of decreasing animal numbers and an improved avg milk yield per cow.The mean blue water consumption for the production of 1kg milk in the time period between 1999 to 2008 was 3.94+-0.29L

A. Methodology

In our research we are used v-notch for determining water footprint of sugar industry. A v-notch is better for low flow stream velocity with discharge is less 448.8gpm. rectangular notch is measure high flow but we are used v-notch for medium flow in sugar factory.

B. Mode of Operation

v-notch is operate on the principle that an obstruction in channel will cause water back up creating head behind the obstruction. The head is work as flow velocity and therefore flow rate through the device.

C. Discharge Computation Procedure

The flow rate is calculated by measuring vertical distance (water depth)from top of the overflow part of notch to the water surface in upstream side.V-notch is better for low streams has more accurate in measuring flow less than 1fcs. The formula is given by table below:

Sr.no	Measuring device (all Sharp crest)	Formula
01	Rectangular notch	Q=3.33LH^3/2
02	Trapezoidal notch	Q=3.37LH^3/2
03	90 degree triangular notch	Q=2.49H^5/2
04	45 degree triangular notch	Q=1.418*H^5/2

Table 1:

Our case study result is as following:

Name	Water required for industry	Day of water	Water used by industry	Waste water by v-notch	Achieved
Mill section(bearing colling)	100	1	150	68.48	50
Floor washing	10	1	10	-	03
Boiling house	150	1	158	-	
Excesscondensate	750	1	500	108	83
Spray pond water flow	450	1	-	-	
Total pipeLeakages	300	1	365	-	88

Table 2:

III. RESULT AND DISCUSSION

The main aim of this project is to save the water which is today's and future's need. According to this project result we save lot of water which is very expensive of purchasing for industrial use.

Water is natural resources is facing many challenges at the various levels. i.e. local, regional and global. Industrial water use is increasingly having negative impact on human health, economic growth and the environmental stability. The industrial ability to measure and account for water use and waste water discharges throughout the value chain is critical component in risk assessment and mitigation efforts. The many industries problem like leakages,relatively wasteful use of water from workers, faulty metering system, excessive use of water for machine cleaning, floor washing etc.

Water footprint accounting is essential for the production industry. According to our project we are saving the water 224m^3 per day.Then we achieving water using ferti-irrigation of spary pond unit by maintaining PH 7.and we are avoiding one time floor washing.Then bearing cooling water is save by providing one pit and recycle water by lifting electric motor and use again bearing cooling purpose.

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