The capacity of the Hydram described in the case study or capacity of any ideal hydram

Answer:

A hydraulic ram pump is powered by a body of water flowing downhill with a height difference. A general rule of thumb is that the water can be pumped 30 times as high as the available drive head (the height difference of the water driving the pump). So a head of 1 m can be used to pump up water to ~30m, while a 7 m head can pump water up to 210 m.

The capacity of a hydraulic ram depends on the scale of the pump, which is often measured in the diameter of the tube delivering the water to the pump. Pumps exist in the range 1" up to 5". With height difference, the actual difference in vertical height is meant, not the length measured along the slope.

In Ladakh the hydrams used is 4" X 2" and 6" X 3" models or type, please find below the performance characteristics of these two models.

Performance characteristics

Table 1 indicates estimated performance for typical 4-inch x 2-inch and 6-inch x 3-inch commercial hydrams.

Table 1: Estimated performance of hydrams

Hydram size (inches)	4" X 2"				6" X 3"			
Head ratio	5	10	15	20	5	10	15	20
Driven flow (litres/sec)	8.96	9.7	10	9.02	20.2	17.2	17.1	19.3
Delivery (m3/day)	94	51	35	23	216	101	69	50

The capacity of pumped water of a hydram can only be calculated involving the site conditions. To add value in the hydram sheets the data of the visited pumps has to be provided and the (with the help of the table given above) the capacity (litre/sec) can be determine.

- Amount of water that the above ideal hydram can pump. example - per hour, per month or annually - any inputs please

Generally the hydrams in Ladakh runs 10 to 12 hours per day or more depending upon the site specifications and water availability. The average amount of water lifted is about 20 litres to 60 litres (can be far less or more)per second.

- How the usage of a hydram during different seasons. Meaning in winter / in summer/in rainy days and its usage is less, more or remains same throughout the year.

In Ladakh the hydrams operates generally for 8 to 9 months (April to November) in about average of about 10 to 12 hours per day. But there are monthly variations in performance of the hydram depending upon the flow and amount availability of the water in the storage pond or source. The peak season is from May, June & July and the rest of the months the hydrams are below efficiency. From last week of November to late March the hydrams are not operating as the water completely freezes. But, there are some sites where the water source is perennial , it may work for longer period.

- The capacity of a diesel engine and the amount of diesel and numbers of hours used for pumping the same amount of water pumped by the hydram in our case.

1. Hydraulic Ram Pumps – ADVANTAGES

- unattended operation
- easy to maintain
- low cost
- long life
- high reliability

DISADVANTAGES

require specific site condition
low output

2. Diesel and Gasoline pumps - ADVANTAGES

Quick and easy to install
Low capital costs
Widely used

Can be portable

DISADVANTAGES

fuel supplies erratic and expensive
high maintenance costs
short life expectancy

noise and fume pollution

Conditions of water supply for DG must be comparable with the condition where the hydram works then only the fuel consumption can per hour (or day) determine.
But in general the diesel water pumps require 3 litres to 7 litres (depending upon the capacity of diesel engine) per day (assumptions) depending upon the type of diesel engine. It can lift water ranging from 80 litres per second up to 150 above litres per second. The running hours of diesel water pumps 8 to 10 hours and it requires rest in between other wise it can be damaged much earlier.
In the case of hydraulic ram pump – energy efficiency is around 50%-70% however the amount of water used (l/s) and the amount of water actually pumped up (l/s) is indeed in the range of 5%-25% (again depending on the site conditions) therefore also the efficiency has to be determined using the actual site data.. Depending upon the head and level as well as the type of hydrams it can lift water ranging from 20 litres to 60 litres (can be far less or more) per second. But hydraulic ram can be run continuously if the water flow and amount is good.