

**WATER TRANSMISSION PIPELINE FAILURE IN UNA  
HIMACHAL PRADESH – A CASE STUDY**

A PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE

OF

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IN

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# CERTIFICATE

This is to Certify that the major project work titled “**WATER TRANSMISSION PIPELINE FAILURE IN UNA HIMACHAL PRADESH – A CASE STUDY**” submitted by **Mr. Amit Singh**, Roll No.2K12/ENE/20 Department of Environment Engineering, Delhi Technological University, Delhi, is the work carried out by him under our guidance and he has successfully completed his project work.

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## **DECLARATION**

I, hereby declare that the work being presented in the Project Report entitled “**WATER TRANSMISSION PIPELINE FAILURE IN UNA HIMACHAL PRADESH – A CASE STUDY**” is an original work and an authentic report carried out as a part of my major project.

The contents of this report have not been previously formed the basis for the award of any degree, diploma or other similar title or recognition and is being utilized by me for the submission of my Major Project-2 Report to complete the requirements of Master’s Degree of Examination in Environment Engineering, as per Delhi Technological University curriculum.

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## List of Abbreviations

<b>SYMBOL</b>	<b>FULL FORM</b>
AC	Asbestos Cement
ISO	International Standard Organisation
CI	Cast Iron
Cumec	Cubic Meter Per Second
CPHEEO	Central Public Health and Environment Engineering Organisation
DI	Ductile Iron
DI K9	Pressure class of Ductile Iron Pipe
ESR	Elevated Service Reservoir
GLSR	Ground Level Service Reservoir
GRP	Glass Fibre Reinforced Plastic
m	Meter
mm	Millimeter
NDT	Non Destructive Testing
PE	Polyethylene
PVC	Poly Vinyl Chloride
R.L.	Reduced Level
RFEC	Remote Field Eddy Current
SAP	Surge Analysis Program
WTP	Water Treatment Plant

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## **Abstract**

Water supply scheme comprises many components like source of water or intake reservoir, WTP, pumping set, transmission main, elevated reservoir, gravity main, distribution reservoir etc. Transmission main plays important role in the water supply scheme. Usually the transport of water from storage facilities to distribution networks takes place through pressurized pipelines. The pressure is created either through gravity or through associated pumping stations. The water is moved from source (such as dams) to water treatment plants and then (usually) pumped into service reservoirs and distribution networks to homes and businesses. Transmission main is a pipeline which transported the liquid from the intake reservoir or water source by the pump to the elevated reservoir for the distribution of water through the gravity flow. Typically water transmission pipelines are constructed using concrete pressure pipes, ductile iron pipes, steel pipes or GRP/GRE pipes. At the lower end of the dimensional range plastic pipes (such as HDPE) may be used.

But many problems are noticed in the transmission main during the commission of pipeline which results in failure of transmission main. These problems are leakage in pipeline, failure of joints, bursting of pipeline etc. The common causes of these problems in Indian condition are surge, corrosion of pipeline, ageing of pipeline with time and improper lying of pipeline etc.

For the analysis of failure of transmission main, it is necessary to compute the stresses in both steady state and transient state of flow. The surge is a common cause of failure of pipeline during commission a pipeline. Surge is a pressure which is generated due to abruptly change in velocity of liquid. The main reason of frequently change in velocity are the startup and shutdown of pump, failure of pump and failure of power. Surge analysis can be done by many software which are available in the market. In these software, one of the software is SAP which is very suitable for surge analysis and its results are also reliable and acceptable. Surge can also be computed by empirical relation.

In this project, steady state has analyzed by EPANET software and transient state of flow has analyzed by SAP software. Allowable stresses in pipeline for the particular pipe material has also computed by according to procedure given in BS ISO 2531-2209(E). These results has compared

with each other and reached up to a final conclusion of analysis. Some appropriate solutions are also try to suggest for the precaution of failure and proper functioning of transmission main.