

## 1 SYNOPSIS

*In areas, where no roads and navigable waterways are available, pipelines could play an important role in transportation of gaseous, liquid and solid materials.*

*The application of pipelines for these purposes is well known. The main object of this thesis is to study the structural and economic feasibility of longitudinally and eccentrically prestressed steel pipes for dual purpose hydraulic transport, and as supporting parts of bridges in chemical industries, in harbour areas and for highways or in a pipeline in general.*

*Analytical structural and stress analysis and experimental investigations on the behaviour of this statically indeterminate system are made. In addition to the effect of axial forces and internal pressures, the effect of uniformly distributed loads and point loads are also considered. Deflections and stresses along the axis of the pipe are investigated both theoretically and experimentally. In order to decide whether this new type of prestressed pipe structure deserves general recommendation, the parameters which affect the design are analysed.*

*The thesis illustrates that it may be advisable to compensate partly, the magnitude and the effect of bending moments and axial forces by eccentric prestressing outside the pipe and to design an economical system to suit the practical application by industries concerned.*

*Finally, the results are compared with those pertaining to similar but non-prestressed structures. The conclusions, guided by aspects of safety and economy, summarise the advantages as well as the further research to be done on this interesting design in the field of prestressed steel structures.*

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