

عنوان مقاله:

F.E. Stability Analysis of Wye-branch Steel Lining

محل انتشار:

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خلاصه مقاله:

Power stations with high heads are nowadays, almost without exception, designed so as to have one pipeline, or only very few pipelines, supplying the water to the generating station. The penstock is connected to a distributor, which has the task of distributing the flow, with the lowest possible losses of energy, to the individual turbines. The function and location of this section of the plant make it understandable that its safety is regarded as a matter of outstanding importance. Careful selection of materials, followed by continuous and extremely meticulous inspections of work-pieces and production processes, enable the manufacturer to rule out unwarrantable risks as regards materials. Furthermore, wellsubstantiated method of computation and experimental stress investigations make it possible to control stresses occurring in the complicated bifurcations. Thus adequate safety and economical design of the construction are ensured by suitable matching of stress levels to the properties of the materials used. Generally, external pressures can occur either during the tunnel grouting operation or on tunnel dewatering after a prolonged period of use, and very often it is the external, rather than the internal pressure, that determines thickness of the steel liner. In cases where a substantial increase in liner thickness would be required to prevent buckling due to external pressure, it may be more economical to provide external stiffener ribs. For short steel-lined pressure tunnels, drainage arrangements to relieve the external pressure load on tunnel dewatering can be considered. However, for long pressure tunnels, it may not be possible to clean the drains periodically and drainage facilities cannot be relied upon. In this paper, a non-symmetry wye-branch is partitioned geometrically into seven imperfect cones. The buckling mode of each section and critical external pressure are calculated upon the effects of geometrical non-linearity in FE framework. This framework can be employed to predict buckling load of such multi-sections thin walled structures against external pressure

کلمات کلیدی:

Finite element, buckling instability, geometrical non-linearity, external pressure

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