

Jointless Concrete Bridges – Development of a Flexible Abutment

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Summary

For bigger concrete bridges the jointless construction hasn't been established up to now. Concerns regarding the durability still exist since constraint stresses as a result of temperature alterations and shrinkage lead to crack initiation. With the use of the new flexible abutment these restraint stresses and occurring cracks can be reduced significantly. An efficient decoupling of abutment and subsoil is reached by introducing a buffer layer of polystyrene and a geogrid reinforced backfill. Full size tests and non linear calculations show that only little deformations arise at the backfill material.

Keywords: jointless bridge, conceptual design, constraint stresses, abutment

1. Introduction

Straight lines, planar surfaces and rectangular angles are unknown by nature. Biological structures, as a result of long evolution, obviously tend to turn into something different because of other criteria than civil engineers assume while designing structures. Trees and bones are always strengthened at areas of high load exposure by the so called adaptive growth process so that stress concentrations are avoided. Respectively weather predetermined breaking points (overstraining) nor underloaded areas (waste of material) appear at the surface. The result is a very strong and material optimized construction. Compared to many civil engineering structures it is characterised by a force flow oriented, continuous design (Fig. 1).

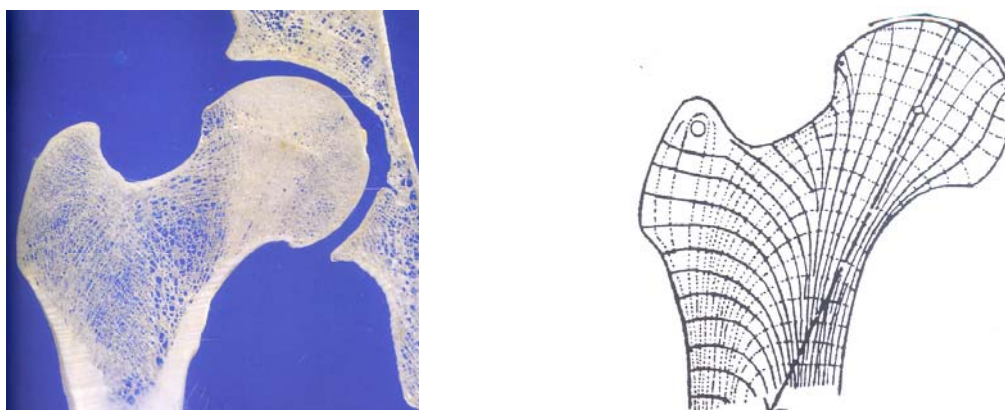


Fig. 1 *Distribution of principle stresses inside a joint bone [1]*