

CIV-E4050 Prestressed and Precast Concrete Structures

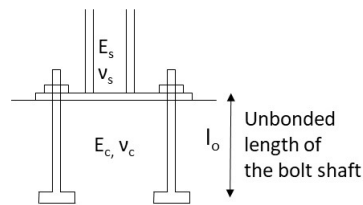
Examination 21.10.2020 (remote examination using My Course)

A precondition for the participation in the examination is the fulfilment of compulsory parts of the course in the autumn 2020 or earlier.

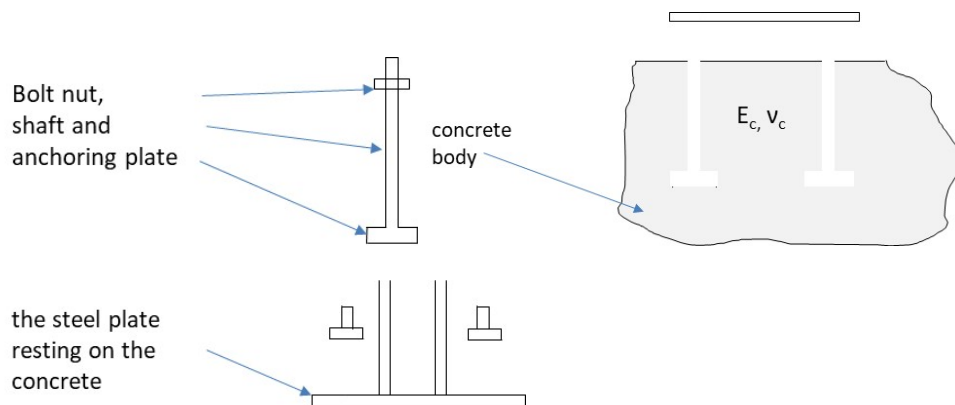
Question 1

Scan your handwritten answers and upload the scanned document as a pdf-file within the period given for this task

1. The figure below represents a prestressed bolt connection to anchor a steel column to a concrete foundation. (altogether 6p)



- a) To describe the effect of bolt prestressing on concrete, the connection can be divided into three main parts. Construct a free-body-diagram of this prestressed bolt connection by adding vertical reaction forces to the figures below (3p)



- b) The bolt shaft is unbonded. Why is it useful? (1p)
- c) What are the consequences for the bolt connection if the bolt stress caused by external loading exceeds the bolt stress produced by prestressing? (1p)
- d) After prestressing the bolts, a compressive normal force is added to the column. Explain its effect on the stresses of bolts. Is it possible that the bolt prestressing can be lost if the compressive normal force is large enough? (1p)