

# Shear in reinforced concrete slabs

## Shear capacity near supports



Typical reinforced concrete bridge

### Subject

Because of increased traffic loads, several reinforced concrete bridges are under discussion. Especially the shear capacity at supports under concentrated loads is sometimes found to be insufficient when using the governing design rules. In order to evaluate the capacity of these bridges, a method to calculate the shear strength of slabs loaded with concentrated loads near to supports is needed. Under that loading a slab can fail in punching or as a wide beam.

### Goals

The goal of this research is to study the shear capacity of continuous slabs under concentrated loads near to supports such that existing bridges can be evaluated.

### Expected Results

The increase in shear capacity for decreasing shear span will be described. The description will distinguish between simple and continuous supports and determine the failure mode (wide beam failure or punching failure).



Formwork and reinforcement for slab experiments



Punching shear (two-way shear) failure



Beam shear (one-way shear) failure

## Shear in reinforced concrete slabs Shear capacity near supports

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### Research Question

How much is the shear capacity of reinforced concrete slabs under a concentrated load near to simple and continuous supports?

### Strategy

Tests will be carried out on 5m x 2,5m x 0,3m slabs with a concentrated load (200 x 200 mm) at different distances from the support to investigate the influence of the shear span on the ultimate shear capacity. The concentrated load will also be placed at different distances to the free edge. The type of support will be varied; line supports, point supports and spandrel beams will be investigated. Also, the influence of plain steel and transverse flexural reinforcement will be studied through testing.

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### Preferred Partners Applications / Sponsors

Rijkswaterstaat

### Research Period

September 2009 – September 2013