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# CONSTRUCTION AND STEEL STRUCTURE

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# CONCRETE STRUCTURES & CONCRETE TECHNOLOGY

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## **Experimental and numerical studies on the bond stress between steel bars and ultra-high performance concrete containing nano-silica**

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An experimental test including 144 specimens based on RILEM standards was conducted by using Pullout test method considering steel reinforcing bars of No. 16 and 18, increasing Nano-silica contents from 0% to 6.5% by weight of cement, conventional and thermal curing methods, the bond lengths and concrete coatings of  $d_b$ ,  $2d_b$  and  $3d_b$  to analyze the bond stress between Ultra High Performance Concrete (UHPC) and steel bars. In order to complete the research, 16 experimentally tested and 39 non-tested specimens were modeled using ABAQUS by taking into account additional parameters such as development length and concrete coating of  $4d_b$  and bar diameters of 12, 14, and 20mm. We finally proposed a comprehensive Local Bond Stress (LBS) equation to calculate the local bond stress between steel bars and UHPC containing nano-silica.

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