

SOLVING ANCHORAGE AREA PRESTRESSED AND NONPRESTRESSED COMPOSITES

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Abstract

Paper present carry out experimental test for assessment behaviour composites in anchorage area because of element bond in cutting in beam or by rote anchorage. Will be make mathematical models in program ATENA. Results experimental test and mathematical models will be comparing. Results are design method for determination anchorage length practice.

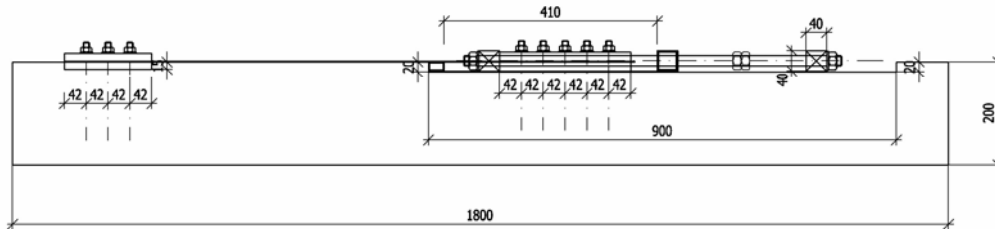
Introduction

Of mid-1990s use nonprestressed composites (FRP strips) for strengthening structures throughout world as well as Czech republic. Experiences obtain on strengthening structures and practise experimental test make for result, that for utilize material property composites and for increasing effectiveness strengthening structures have to need use FRP strips, as that of prestressed reinforcement in the form of reinforcement noncohesion (loose cable). By reason of safety so that do need mechanical failure FRP strips, there are bond in the entire area.

Desciption experimental test make to in laboratory KÚ ČVUT

For verification new prestressed system firm STADO CZ, Ltd. will be make experimental test in laboratory KU ČVUT in Prague. System is construct of tensive apparatus made in firm “Chartered metrological centre K 103”, Czechova 20, Prague 7 (Mr Josef Hajek), mechanical anchorage elements, two steel plates thickness 15 mm size 150x168 mm, six chemical anchorage M12, (inactive anchorage), so-called “tray” to which put upon active anchorage with drawing gun. Drawing gun it can be append to mechanical “hand” piston or press. The experimental element consisted of the reinforced concrete beam (250x350x1800mm) made of concrete B 30 according to the Czech Standard CSN 73 1201. Beam have to cutting size 170x350mm depths 15mm for inactive anchorage and cutting size 900x350mm depths 20mm for active anchorage with drawing gun. Tension strip have to take around step by step 7 kN so far maximum force 70 kN, that will be voted by standard strip from offer firm STADO CZ, Ltd. type S, size 50x1,4mm with Young’s modulus $E=150\text{GPa}$ and tensile strength $\sigma_t=2000\text{ MPa}$. At tension strip will be monitoring strain strip, compression concrete and pressure into exit from mechanical press. Along expiry tension and anchorage FRP strip in active anchorage will be for eight week measuring slip strip in anchorage, change strain concrete (compression) and strain strip.

Pohled z boku



Pudorys

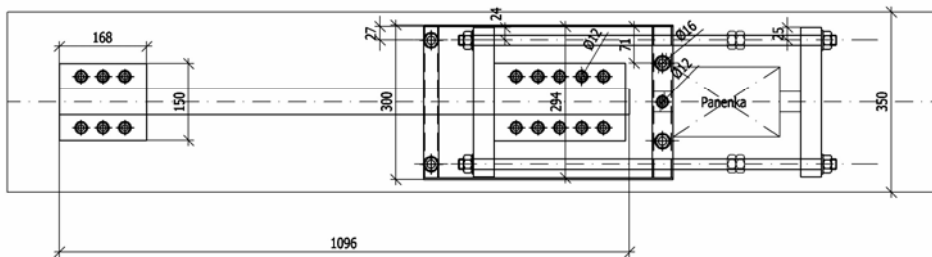


Fig. 1

Sight to experimental element with inactive and active anchorage with drawing gun

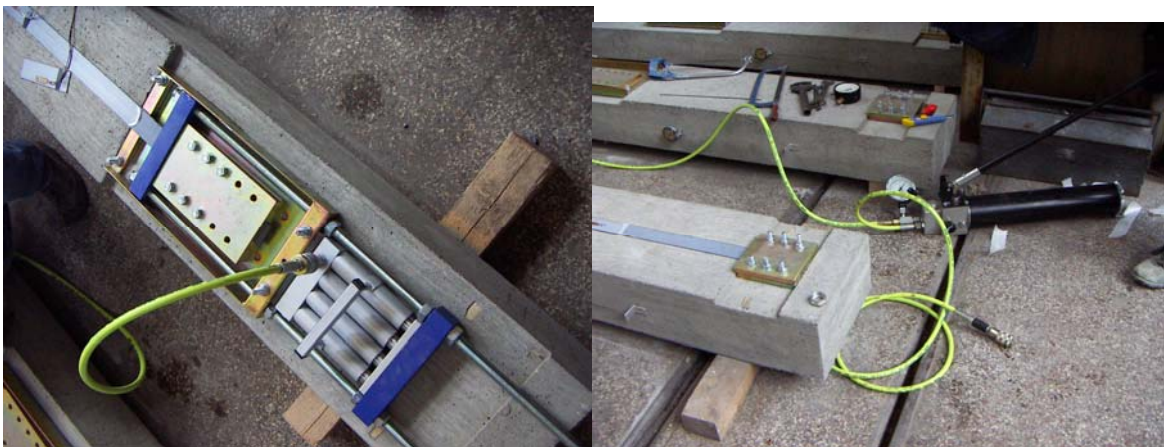


Fig. 2 Detail drawing gun, (four coupled piston all of piece) and mechanical piston

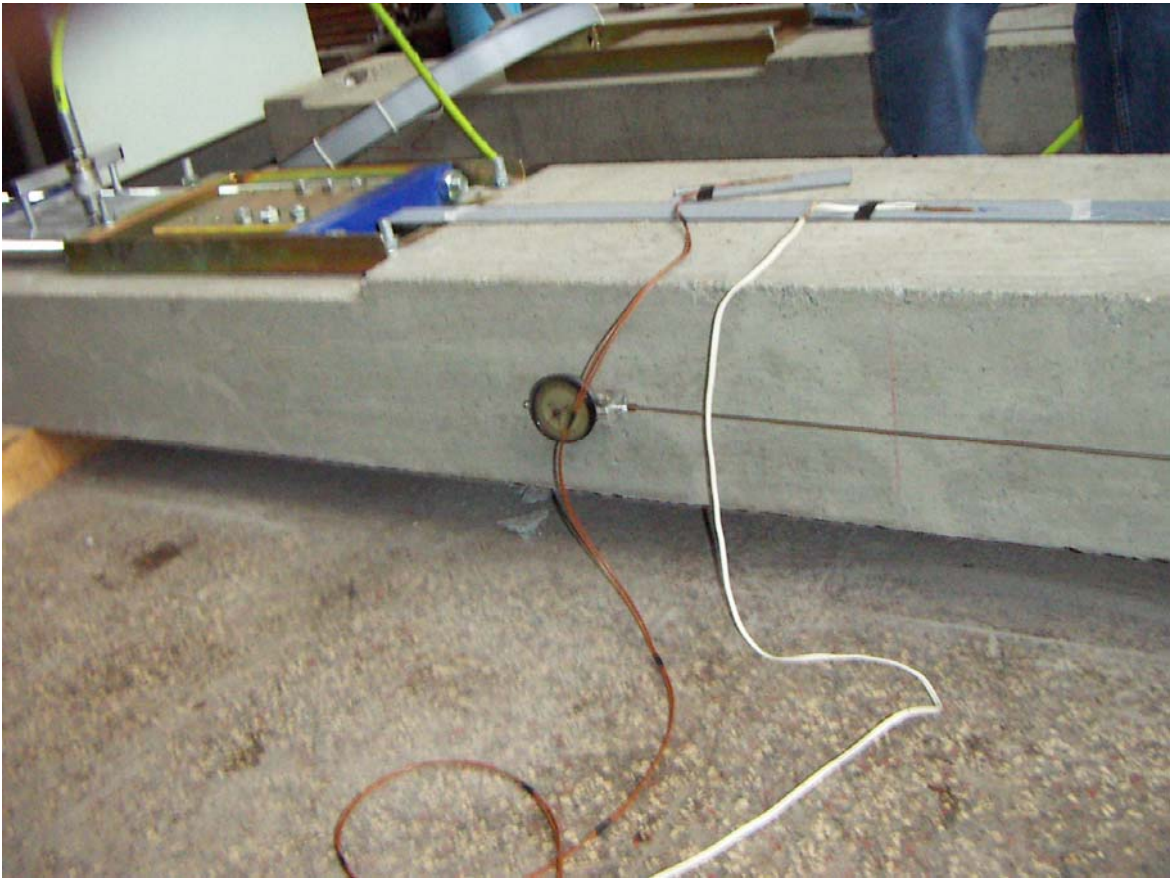


Fig. 3 Sight on gauging watch monitoring strain experimental concrete element

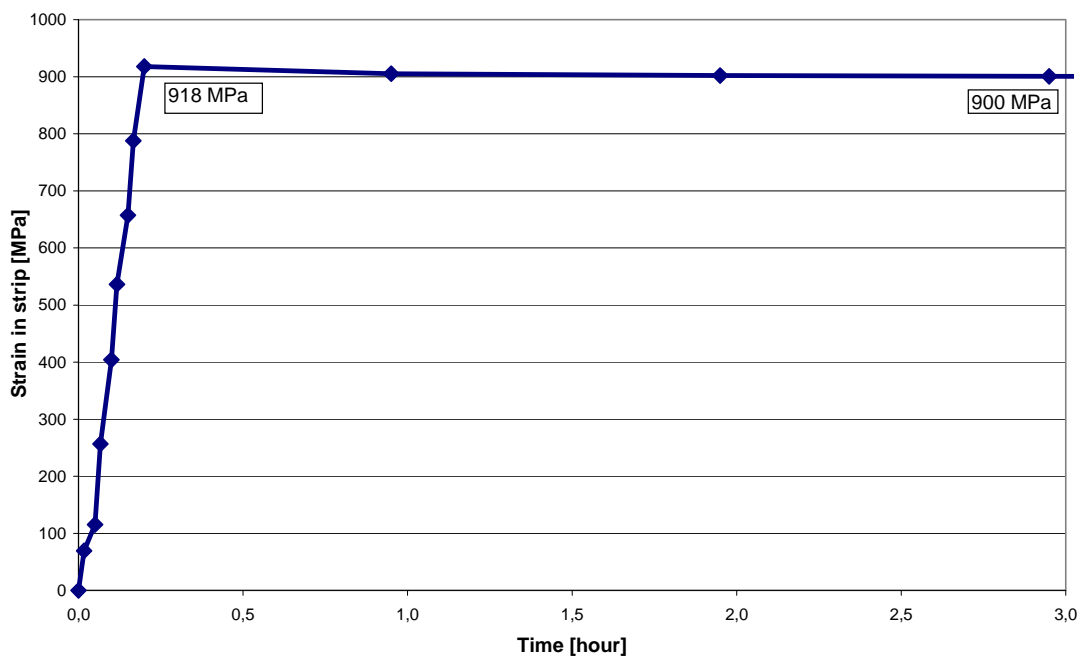


Fig. 4 Time trend state of stress in strip after strain on force 70 kN, detail opening three hour

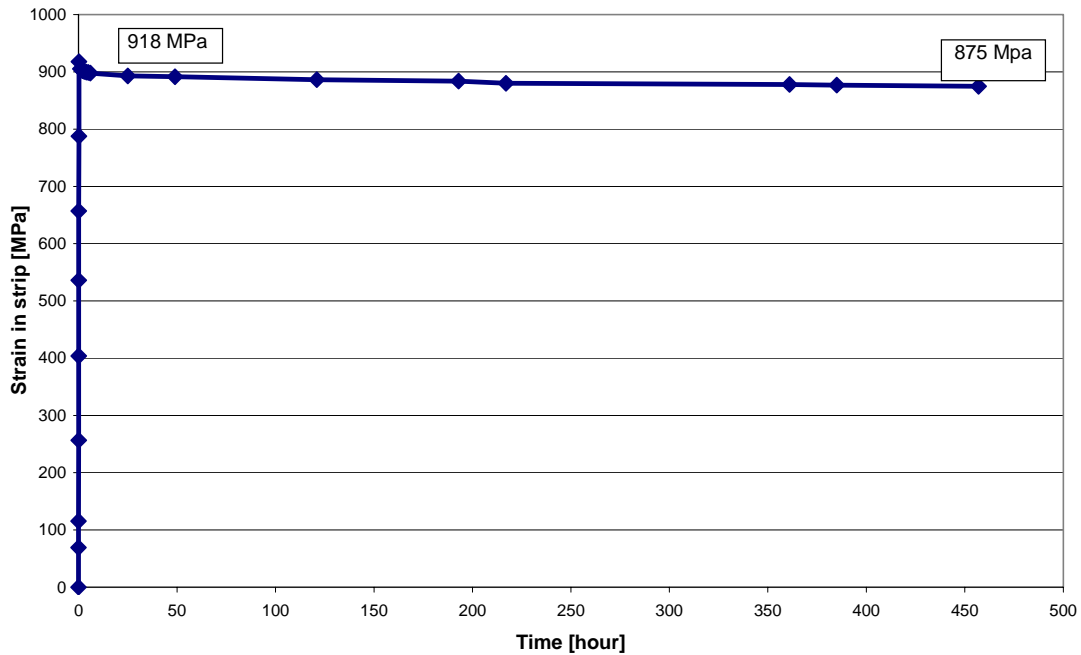


Fig. 5 Sight to diagram caption development of stress in prestressed strip in time

Check on experimental data upon model make to programme Atena

Above describe experimental element will be model in programme ATENA, that will be have to monitoring behaviour element at point active and inactive anchorage, i.e. transmission force from strengthening strip by mechanical anchorage to the concrete and propagation stress in concrete near anchorage.

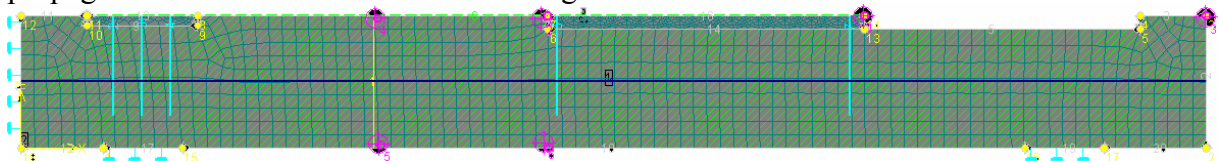


Fig. 6 Sight experimental model in programme ATENA

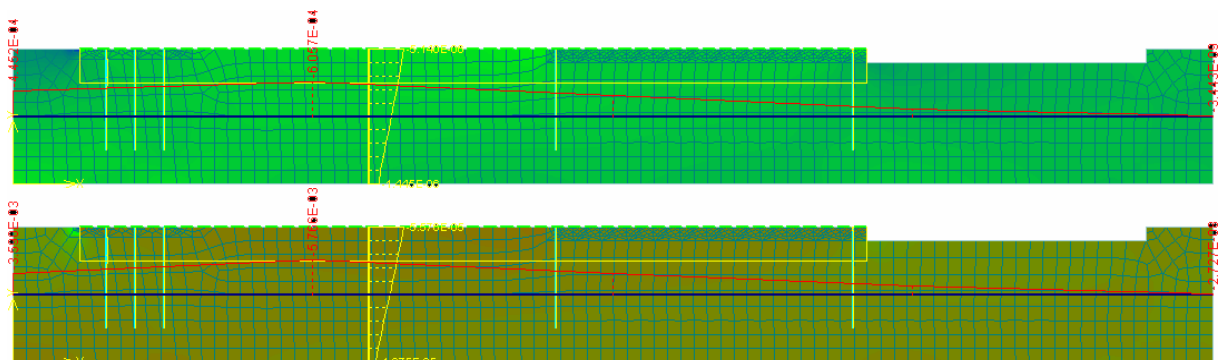
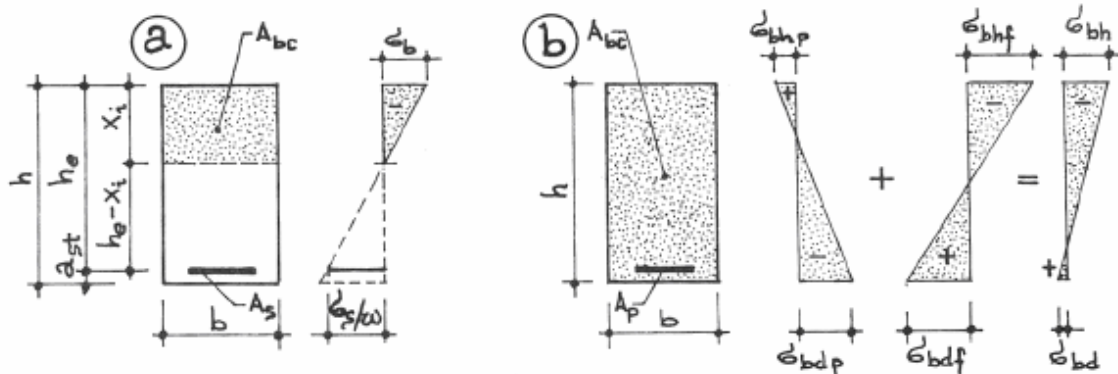


Fig. 7 Sight to propagation stresses and forces in experimental element first step 7kN, last 70kN

Flexion strain concrete beam gauge on experimental test in axis has been 0,005 -0,007mm by up to auxiliary aiming longitude 500mm, e.i. $\epsilon = 0,00001$.

Sequence of design strengthening structures use prestressed FRP strip

Design principle getting on philosophy limiting strain when will be need set down and verify size structure before thickness, e.i. in time application prestressed.



Sight on distribution strain inside of cross-section reinforced and prestressed element, that after application prestressing have to verify size of strain in upper face side, let us say after application loading write up strain in under face side. Prestressing may be design for full prestressed beam, but in most cases in part prestressed beam, when tensile stress transmit original reinforcement strengthened beam.

Conclusions

Following performed monitoring and gauging it is possible state :

- Once in one case do not get during monitoring (thour week) to sudden slip strip in anchorage and sudden prestressing loss
- In the event of that do not get cantrail failure strip during prestressing will be total prestressing loss (from deinitialization tensive apparatus, creep and relaxation) after thour week to about 5 %

Analogicresults will be publication abroad letter-press

On basic done in on experimental test in laboratory KU ČVUT in Prague will be system building approval in test room TAZUS Prague. After that will be two prestressed system in Czech republic, first by firm SSŽ, Inc. that will be developed by firm SIKAZ, Ltd and system by STADO CZ, Ltd. Using prestressed FRP strip fordize their taking advantage of tensile strength but 60 %, while bond strip is use for 15 as 20 % its tensile strength.

Aknowledgements

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