

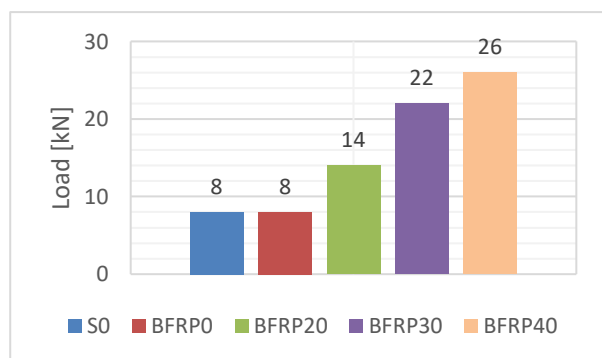








had a first visible crack at a load of approximately 8kN. The opening of cracks is related to exceeding of the tensile strength of concrete on the tensile face of the flexural member; therefore, by introduction of a prestressing force, the appearance of cracks was delayed for prestressed samples. Furthermore, the increase of the level of prestress resulted in a further delay of the appearance of the first crack on the bottom of the beams. It should be also noted that all the initial cracks appeared in close proximity to the midspan of the loaded samples.



**Fig. 5** Load corresponding to initial crack appearance

## 5 Conclusions

Based on continuous monitoring of the initial strain level and subsequent analysis, the following conclusions can be made:

- The fastest rate of decrease of strain, of approximately 0.20% per hour on average, was observed for the initial period of around 24h from the application of the external prestressing force.
- The subsequent period was characterised by a much more gradual continuous decrease of strain, at a rate of around 0.1% per day.

Additionally, based on the flexural behaviour of five samples tested under four-point bending until destruction, the following can be concluded:

- Prestressing of BFRP reinforced samples with over 30% of the ultimate tensile capacity of the bars improved the serviceability performance of the beams to a level higher than that of the steel reinforced sample.
- Ultimate deflections of all prestressed samples were reduced in comparison with the unprestressed BFRP sample.
- The initial appearance of cracks on the tensile face of the samples was delayed for the prestressed samples, correspondingly with the level of prestressing applied.

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