especially under concentrated loads in the vicinity of the perforations and also influenced by the position of the perforations.

The authors have recently proposed unified strength reduction factor equations for the web crippling strength of cold-formed stainless steel lipped channel-sections with circular web perforations under the one-flange loading conditions (Yousefi *et al.* 2016, 2017a,b,c). The equations covered three stainless steel grades: duplex grade EN 1.4462; austenitic grade EN 1.4404 and ferritic grade EN 1.4003. Similar equations for cold-formed carbon steel under end-one-flange loading condition have previously been proposed by Lian *et al.* (2016, 2017), which was a continuation of the work of Uzzaman *et al.* (2012a,b,c, 2013) who had considered the two-flange loading conditions. When applied to the stainless steel grades, (Yousefi *et al.* 2016a,b,c, 2017a) showed that the equations proposed by Lian *et al.* (2016a,b) for the end-one-flange (EOF) loading condition were unconservative by up to 7%. Also, Yousefi *et al.* (2016d, 2017b,c) showed that the equations proposed by Uzzaman *et al.* (2012, 2013) for the interior-two-flange (ITF) and end-two-flange loading conditions were unconservative for stainless steel channel-sections. Yousefi *et al. (2017c-j)* also conducted a series of test programme on unlipped cold-formed ferritic stainless steel channels under two-flange loadings and proposed strength reduction factors due to openins in web.

In the literature, for cold-formed stainless steel lipped channel-sections, only Krovink and van den Berg (1994) and Krovink *et al.* (1995) have considered web crippling strength, but limited to sections without perforations. Zhou and Young (2007, 2013) have considered the web crippling strength of cold-formed stainless steel tubular sections, again without perforations. Research by Lawson *et al.* (2015), while concerned with circular web perforations, focussed on the bending strength of the sections and not on the web crippling strength under concentrated loads. In terms of cold-formed carbon steel, Gunalan and Mahendran (2015) have also considered a Direct Strength Method approach for the web crippling strength of channel sections, again without perforations. For cold-formed carbon steel lipped channel-sections, recent work has included Natario *et al.* (2014) and Gunalan and Mahendran (2015), all without perforations.

In this study, a test programme was conducted on cold-formed ferritic stainless steel unlipped channel sections with circular web perforations. The cases of both flanges fastened and flanges unfastened to the bearing plates are considered with the sections subject to interior-one-flange (ITF) and end-one-flange (EOF) loading (see Fig. 1). The finite element modelling presented in this paper uses the general purpose finite element analysis program ABAQUS (2014) for the numerical investigation.