Strength data of Italian red spruce

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The Val di Fiemme region in Trentino is one of the largest softwood producing areas of Italy for use in structural applications. The whole province of Trentino produces around 400.000 m^3 of sawn timber each year, of which a large part is used structurally. In the last 15 years strength data has been gathered in several research projects consisting of a viariety of material sizes, origins and qualities. The projects dealt with both visual and machine strength grading using ultrasound. The visual grading rules applied were in accordance with Italian standards which closely resemble the German visual grading rules for softwoods. Besides visual grading all beams were also graded using ultrasound. Strength profiles have been determined in accordance with European standards EN 384. Characteristic values and the strength profiles of the subsamples have been determined and the scatter in mean and characteristic values for bending strength, modulus of elasticity and density are analysed statistically. In addition, the whole sample is analysed for the volume effect, which was found to comply well with Eurocode 5.

Ultrasound grading alone proved not to be very sufficient in increasing the yield in higher strength classes. However, a combination of both visual and ultrasound grading improved the yield in high strength classes considerably. Boundaries for the ultrasound wave speed have been determined. It was found that traditional strength profiles of EN 338 are not satisfactory for the timber studied, and for use in combination with a design standard a specific strength profile has been determined.