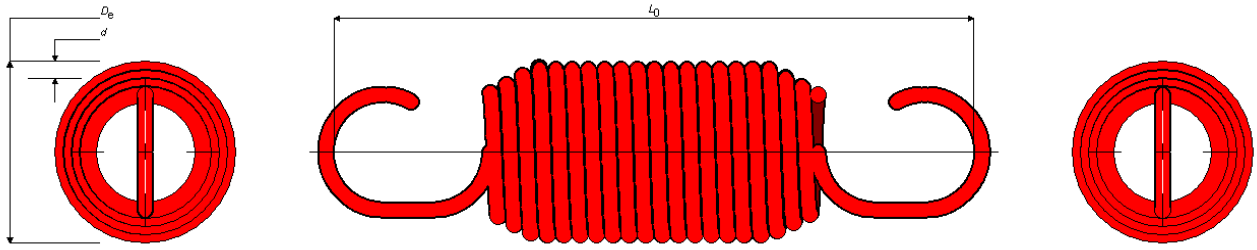
Technically Speaking XII

Computer Aided Design

Most spring manufacturers in most countries of the world supply their products to the drawings provided by their customers. The responsibility for spring designs usually lies with the end using company, but IST recommend that spring manufacturers should validate the designs they are asked to manufacture. This validation enables the spring manufacturer to supply advice about the design and the likelihood that the spring will be “fit for purpose”. This advice raises the level of service offered by the spring manufacturer to that which IST would regard as the minimum standard. To provide this type of advice the design of the spring needs to be checked against the applicable standards and data resources, and is much easier to do if a computer aided design (CAD) program is available.

The purpose of this technically speaking column is to draw the attention of readers to the availability of CAD programs for most spring types, and to describe some of the improvements that are currently in the process of being applied to IST’s version 7.6 software. For instance, compression springs will shorten when prestressed in manufacture – this is evident, but the CAD program now displays an approximate length for the first-off sample at the coiler. This concept was described in the Spring 2009 article in this series, and has now been incorporated into the software. For compression springs there are also predictions of the effect of operating a spring at a speed too close to its natural frequency and tolerance data has been included on the spring drawing because that is what spring manufacturers wanted.

Many of the developments originate from the Techspring research project managed by the author and part-funded by the European Commission. The developments apply to extension springs also. For these there is now a prediction of the fatigue life of hooks – always the most vulnerable region on such spring when the hook is the same diameter as the body. Indeed the software allows you to design extension springs with reduced diameter hooks in which the hook is no longer the place at risk for fatigue failure, an example being shown below.



For torsion springs and clock springs the allowable stress for prestressed products has been increased from 100% to 130%. The rationale for this change was explained in the “Technically Speaking” column of Spring 2010. IST are bringing together many recent developments and including them in their CAD software, and this column presents just a few examples of the developments.

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Readers are encouraged to contact him with comments about this technically speaking column, and with subjects that they would like to be addressed in future.
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