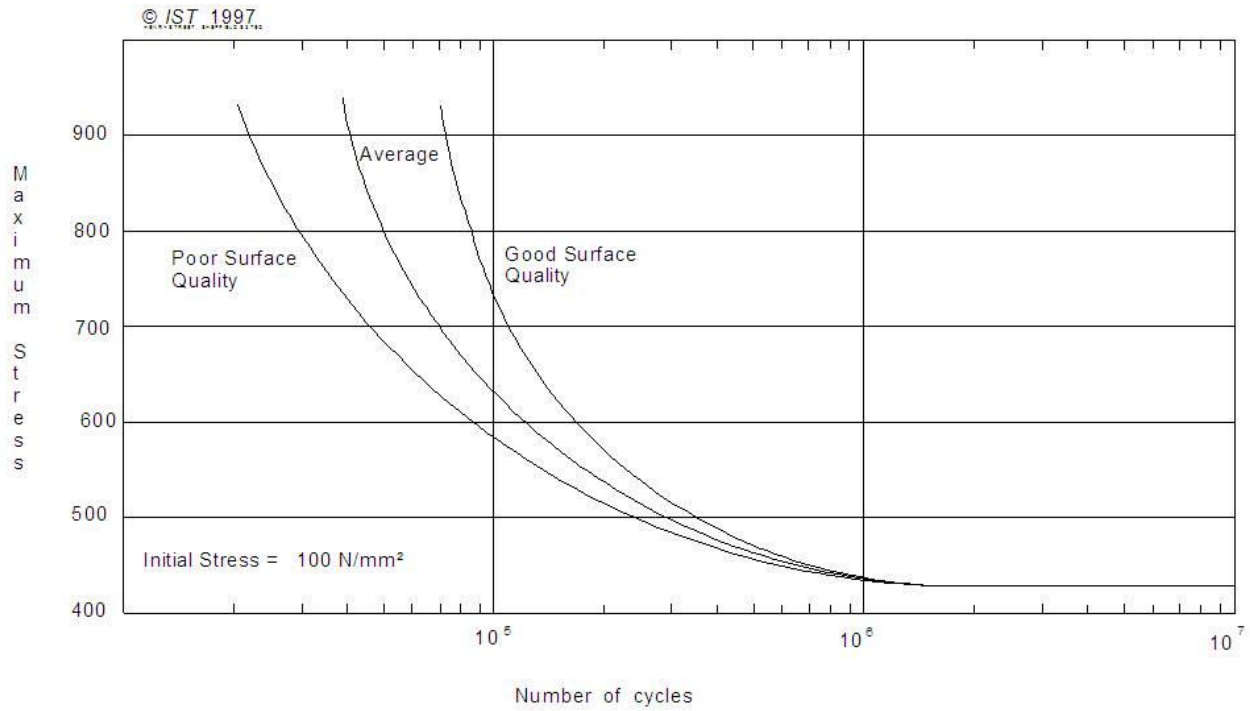
Technically Speaking 7

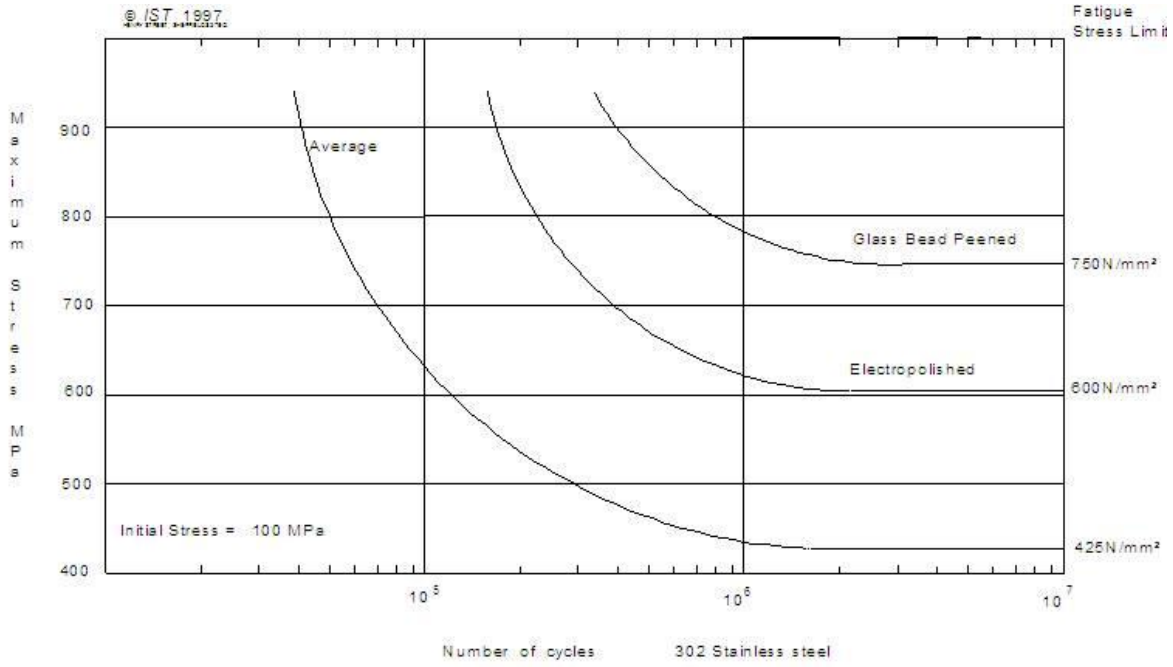
Shot Peening

Shot peening of compression springs improves their fatigue performance by creating beneficial compressive residual stresses, and these residual stresses can be accurately measured. This subject was one of many studied in Techspring, a research project part funded by the European Commission, and undertaken by a consortium of European companies of which IST was one.

However, shot peening also work hardens the spring surface, changes the surface topography, and, some say, takes away defects and decarburisation, and all these factors contribute to the beneficial effect upon spring fatigue performance. The purpose of this article is to show that it is the residual compressive stress that is more important than these other parameters.

Stainless steel compression springs made from 2.34mm (0.092”) 302 grade wire were made. In the first instance the effect of surface quality was evaluated, as shown in the S/N graph figure 1. IST obtained lots of wires from around the world and categorised them into good, average and poor surface quality, and then had compression springs made. The fatigue test results from these spring clearly showed that at high applied stresses the surface quality affected spring life, but at lower stresses, the surface quality became unimportant.





IST then took the average surface quality springs and electopolished them

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Readers are encouraged to contact him with comments about this cautionary tale, and with subjects that they would like to be addressed in future tales.

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