**Cautionary Tale XXX1 Off-Shoring**

The British perspective on ‘off-shoring’ is bound to be rather different from that in the USA. For a start, the word ‘off-shoring’ is not yet frequently used. It might be taken in the UK as meaning that you are involved in the North sea oil and gas industry, but since our oil and gas resources are diminishing this is clearly not the industry of the future. Hence, it is reasonable to assume that word means ‘manufacturing goods off-shore’ mainly in China, India and the Far East.

IST receive springs at an increasing frequency for investigation that were manufactured in China or India. A few of the springs made in India were made for export to Europe or USA, but the springs from China have always been part of an assembly made in China. IST have to keep details of all these investigations confidential, but there are some trends emerging from the, on which it is reasonable to relate in this Cautionary Tale.

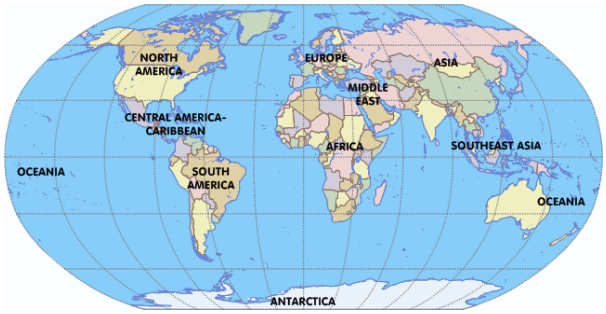
First and foremost, IST’s customers are very suspicious of the quality of the raw materials used when springs, made off-shore, do not function as they should. These suspicions are mostly ill founded. The surface quality of the spring materials available in both India and China are improving, and nearly always meet international standards (particularly US standards, which are generally the least stringent in the world, but that is another tale). The most frequently encountered problem with materials is understanding exactly what is required. It took the author several e-mails to explain to a Chinese manufacturer what prestressing was. In another case austempering was specified and innumerable e-mails never achieved an understanding, and so the parts are now accepted in the hardened and tempered condition.

Explaining to Chinese manufacturers that their interpretation of the drawing requirements is not correct is a difficult task. There are language, cultural and technical barriers to be overcome, which can be very frustrating, but the spring industry’s customers will continue to re-locate the manufacture of goods or assemblies when volumes are high and the manufacture or assembly is labour intensive. Global market forces will out.

IST’s response to the threat to spring manufacturing from off-shore competition is to promote research to advance spring technology. Stress analysis methods are the area in which most progress can be made in our opinion. If finite element analysis, use of high speed cameras, residual stress analysis methods, and others can be made more readily accessible to spring manufacturers, they will have a basis to design and manufacture leaner and meaner products that off-shore manufacturers will not be able to match. IST is leading a consortium of European companies and is in the last stages of trying to secure a contract from the European Commission for research into these areas.

But back to the subject of off-shoring, for the first time recently IST received stainless springs in an assembly made in China that worked better than those made in Europe - i.e. they lasted twice as long in a fatigue life test. The reason for this proved to be the passivation process applied, as a matter of course, in China. The more usual story though, is that springs made off-shore work less well. In one case springs made in India passed their relaxation test in India (only just), but failed at the end user (marginally) because they had grown in transit after hot prestressing. In another case Chinese assemblies sometimes failed a test whereas European made ones always passed. The zinc plated compression spring was suspected to be the reason, but it proved to be the way the spring fitted on mating components, which weren’t being machined consistently enough, that was the root cause of the problem.

More examples will be generated in months to come. Globalisation is here to stay, but it will only make sense to manufacture some products in low labour costs countries, and the time when manufacturing ceases to be transferred is difficult to predict, but you can be certain that China and India's ability to absorb more manufacturing has not yet been reached, and when it has there are plenty other countries in the Far East and Africa able and willing to offer their labour force.




**Relative costs of manufacture in selected countries**

| | Labour | Raw Materials |
|---|---|---|
| China | 5 | 1 |
| India | 6 | 1 |
| USA | 100 | 1 |
| Germany | 100 | 1 |
| Japan | 100 | 1 |
| UK | 85 | 1 |
| Poland | 16 | 1 |

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