



### **Gearing Together – If You Do**

First, if you do gear together have a very good reason to do so. Just because ‘grandpa did it’ probably does not qualify as a good answer anymore. ‘We know it is good enough and is far cheaper’ may qualify. However, that reasoning puts a tremendous burden of proof and a very high bar for process and economic knowledge for those making the claim. If they are wrong, your plant just bought a dinosaur.

Second, if you do gear things together, gear them together at a 1:1 ratio to a tolerance of a few parts per 10,000. An exception might be extremely stable, well-known, one-product machines such as legacy printing presses that use a progressive draw between sections because the material has changed length slightly (due to heat, moisture, creep, etc) and consistently.

Third, if you do gear things together, maintain diameter tolerance of all connected rollers to a few parts per 10,000. Failure to detect even tiny diameter changes due to wear or contamination will cause you to lose control of web tension and suffer any results from losing control. Please note that rubber rollers should not be speed driven much less geared together. The obvious reason would be that wear is inevitable and quick. The other reason is more subtle reason applies only to nips. That is the speed and thus speed ratio of a rubber or compressible roll(er) in nip is indeterminate. Actually it is determinate but is too complex to do so because it depends on nip load, Poisson ratio and other factors. Indeterminate is just a fancy term for ‘your process and product is going to be inconsistent.’

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