

# Rigging Cables

I have been rather frustrated lately with the number of field failures I have encountered that are related to the humble [cable tie](#) (Figure 1 - [Source](#)).

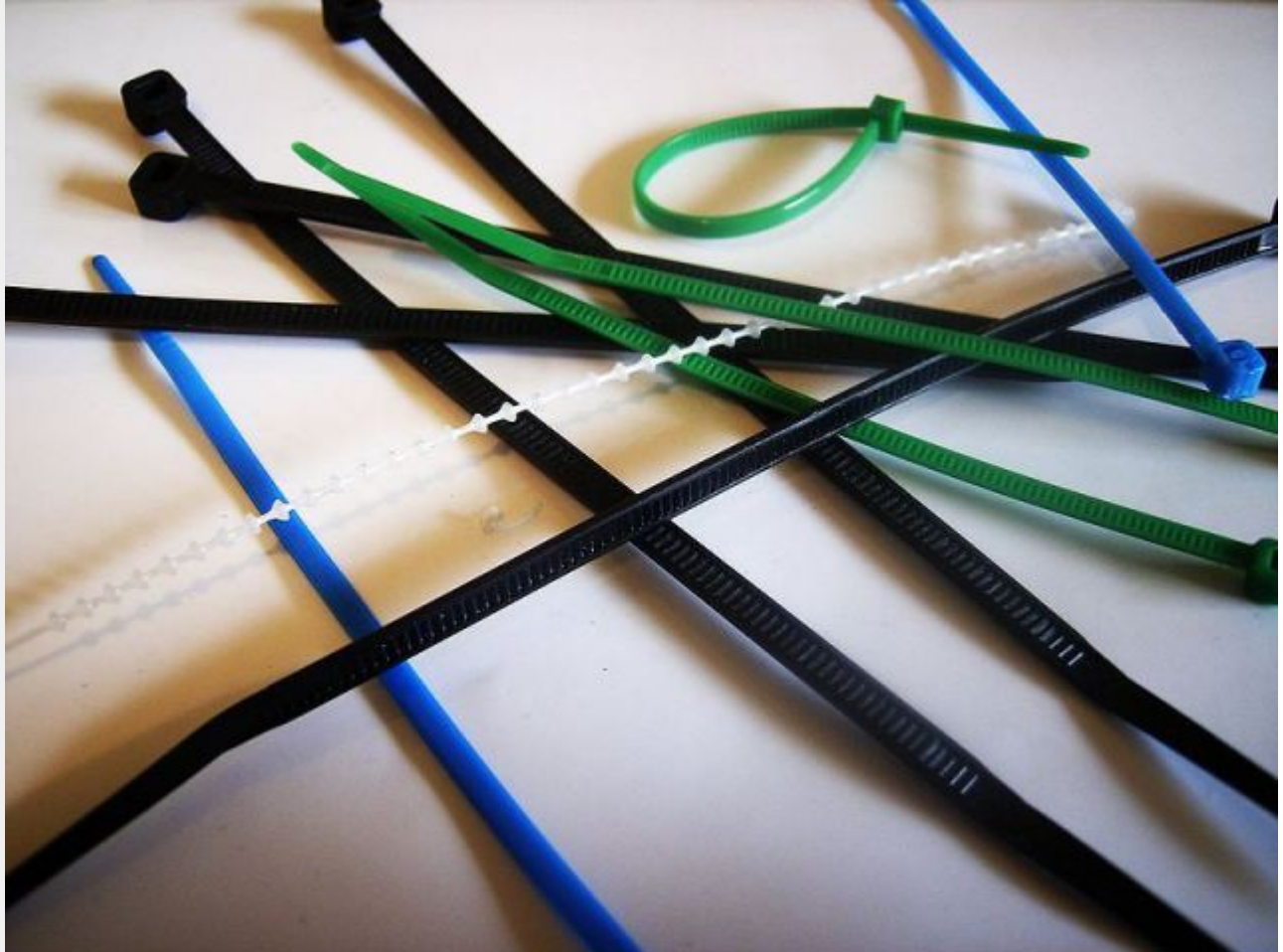


Figure 1: Assortment of Cable Ties.

There are several problems related to cable ties.

- ☐ They are easy to over-tighten  
Many people tighten the cable ties so tightly that they damage the insulation of the wires.
- ☐ If your cables move, the cable ties tend to “bite” into the insulation.

I just encountered this problem in our office. Instead of standard [whiteboards](#) for marking, we use [SMART boards](#). One of our SMART boards behaved very erratically. As we investigated, we discovered that the cable tie used to secure a cable had [abraded](#) the insulation off of some wiring.

- ☐ They can be used to tie cables in positions that put strain on connectors.

This problem has created some real problems for me. The cable riggers pulled that cables at very odd angles which put strains on [Printed Circuit Boards](#) (PCBs). PCBs are not designed to be under mechanical strains and we have seen issues.

I started to look around for good examples of [cable rigging](#) that did not use cable ties. I soon found that the folks at NASA have done some very nice rigging on their Mars rovers. Figure 2 shows one example. For a great discussion of rigging for Mars, see this [forum discussion](#).

It is not hard to believe that NASA understands cable rigging. They have had some issues in the past and they learn from their mistakes (e.g. [Space Shuttle](#) and [Apollo 1](#)).

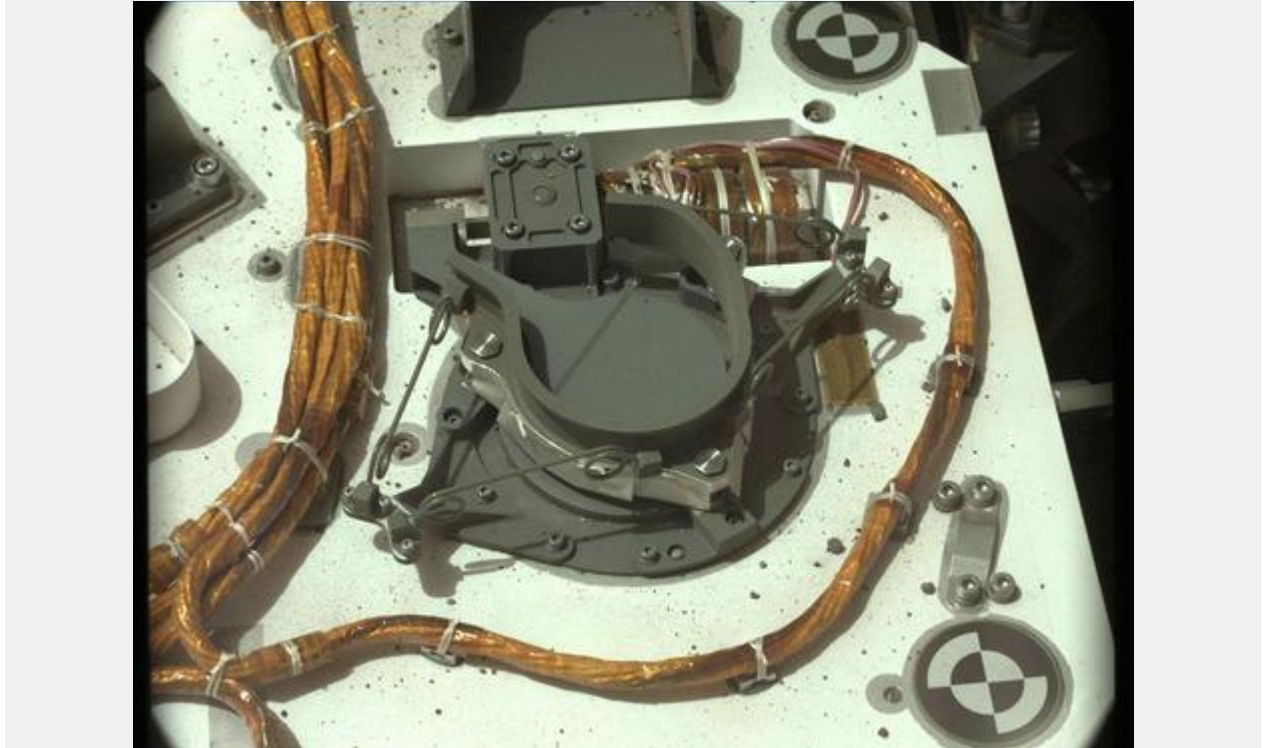


Figure 2: Mars Curiosity Rover Cable Rigging.

I have found some good aerospace reference material on rigging that I want to make more readily available. These methods seem very reasonable to me.

- ☐ [AC 21-99 Aircraft Wiring and Bonding](#)
- ☐ [NASA-STD 8739.4](#)
- ☐ [NASA checklist on rigging](#)

I will be using these standards in my engineering group for guidance. There are a number of vendors that put out rigging supplies. Here is [one vendor](#) recommended in the [forum](#) of [Guild of Knot Tyers](#).

There is also some good material put out by the telecommunications companies — some of this material is over 100 years old ([Old 50 MByte Telephone Spec](#)). For example, Figure 3 shows an approach from this old material that I still occasionally use.

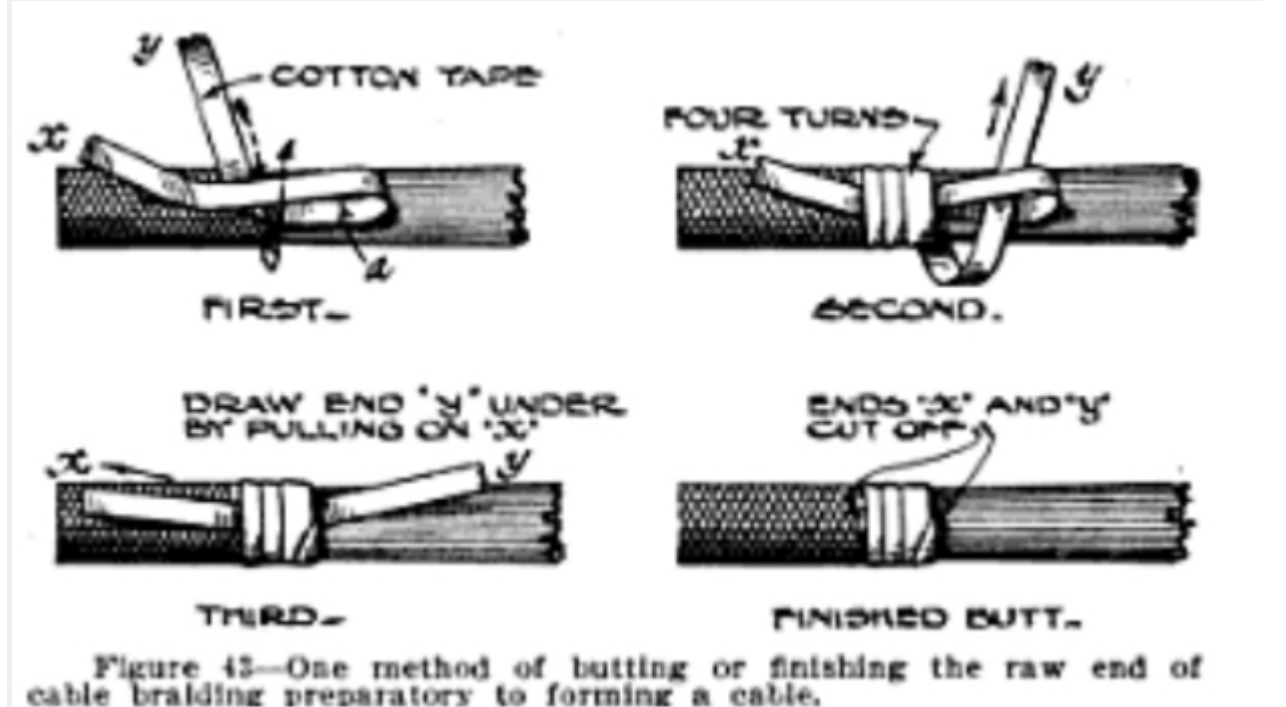


Figure 3: I Often Use This Approach to Cleaning Finish the End of A Cable.

In the old days, they even referred to sewing cables together (Figure 4).

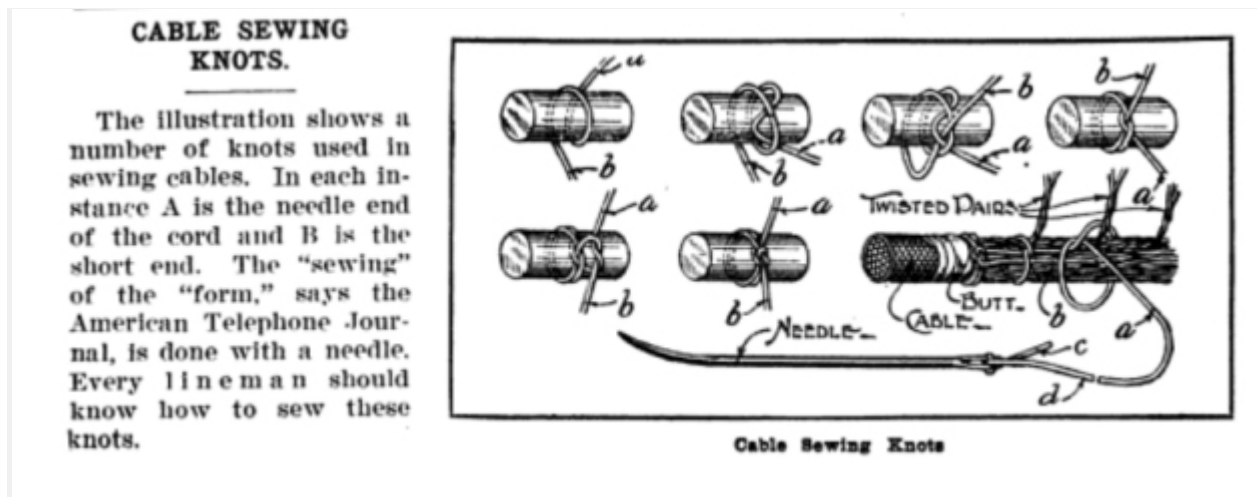


Figure 4: Example of Cable Sewing.

On a personal note, I am a big knot person. Studying knots and their application have been a recreational activity of mine for years.

Source : <http://mathscinotes.wordpress.com/2014/01/11/rigging-cables-is-really-important/>