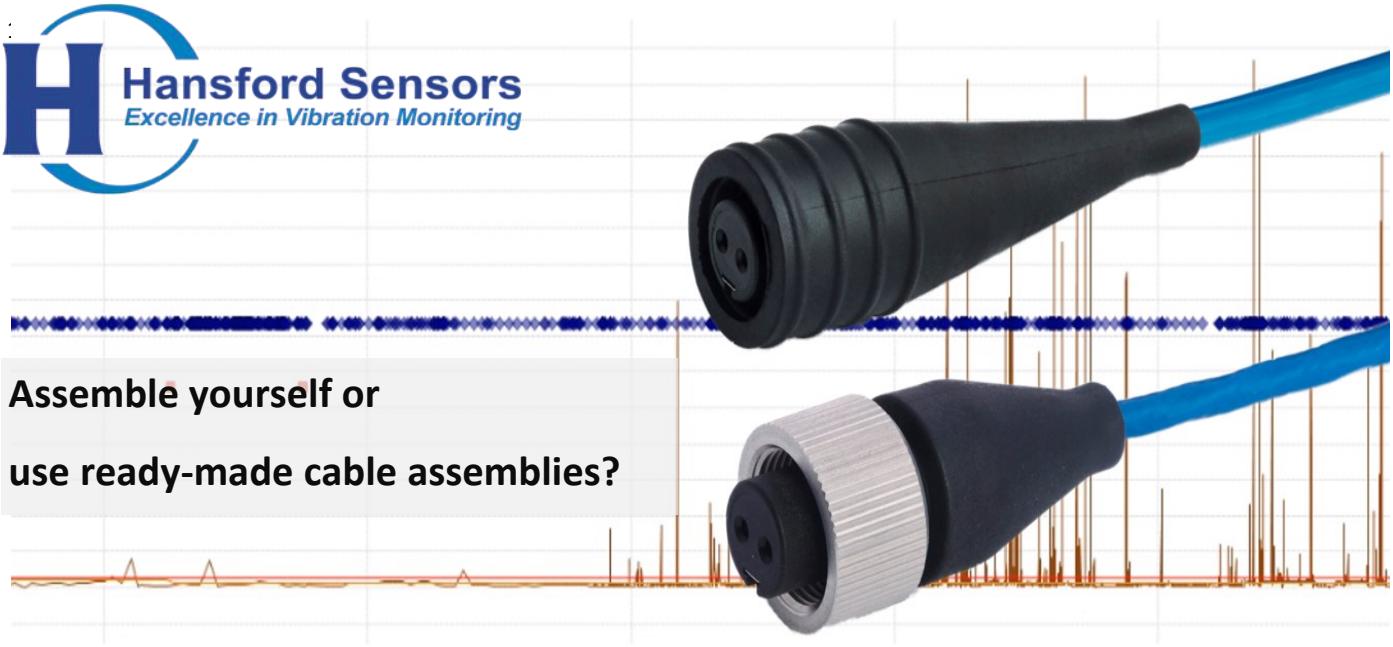
Hansford Sensors
Excellence in Vibration Monitoring



Assemble yourself or use ready-made cable assemblies?

This question always arises when the cable lengths cannot be estimated when preparing the offer and planning. But is self-assembly actually more economical in the end?
In 2020, Hansford Sensors recommends the use of pre-assembled cable assemblies with defined lengths for 97% of all projects.
With this practical example we would like to consider economic aspects and share our long-term experience with you.

The advantages of self-assembly are obvious:

1. The cable supplied on a roll can be tailored precisely at the measuring point. This reduces the waste and thus the material costs.
2. Exact planning and the necessary measurement in advance are not necessary, and this also reduces costs.
3. The cable can still be pulled in from both sides without the plug. This reduces the logistical effort and means faster installation in case of doubt.
4. The cable is freely selectable and can be optimally selected for the application without compromising on the choice of connector.

The self-assembly has some advantages on its side. The disadvantage is:

1. Expenditure of processing the connector on site under possibly difficult conditions.
2. There are plugs for soldering, which mean a lot of work on site, and plugs for crimping, which means the purchase of a crimping tool. For high protection classes, the plugs often have to be encapsulated using a two-component adhesive.

Why does Hansford Sensors still recommend the use of pre-assembled cables for most projects and applications?

The greatest advantage is the high quality of workmanship. Machine-assembled cables are manufactured under ideal conditions and with controlled processes in the factory. A high and consistent quality, 100% tightness and good connectivity pays off in long-term use.

Faults during installation often only show up when the system has been in operation for a long time. The search for the cause of the gradually atypical behavior often turns out to be problematic.

Example:

The evaluation of signals one accelerometer on one Drying cylinders in the paper industry showed eye-catching tips in the Vibration velocity signal. The examination of the bias voltage showed abnormalities and an unstable course (Figure 1).

The spectrum shows very low-frequency, increased frequency components that looked very similar to a ski-sloping effect. At this point in time, the plant operator's maintenance department started the first troubleshooting. The effects occurred sporadically and could not be assigned to any external influence. As the number of false alarms increased, the system operator deactivated the affected channels, effectively deactivating a third of his predictive maintenance. In the further course the frequency of the peaks increased, the system operator turned to Hansford Sensors.

Figure 2 shows the same drying cylinder when the support from Hansford Sensors was contacted.

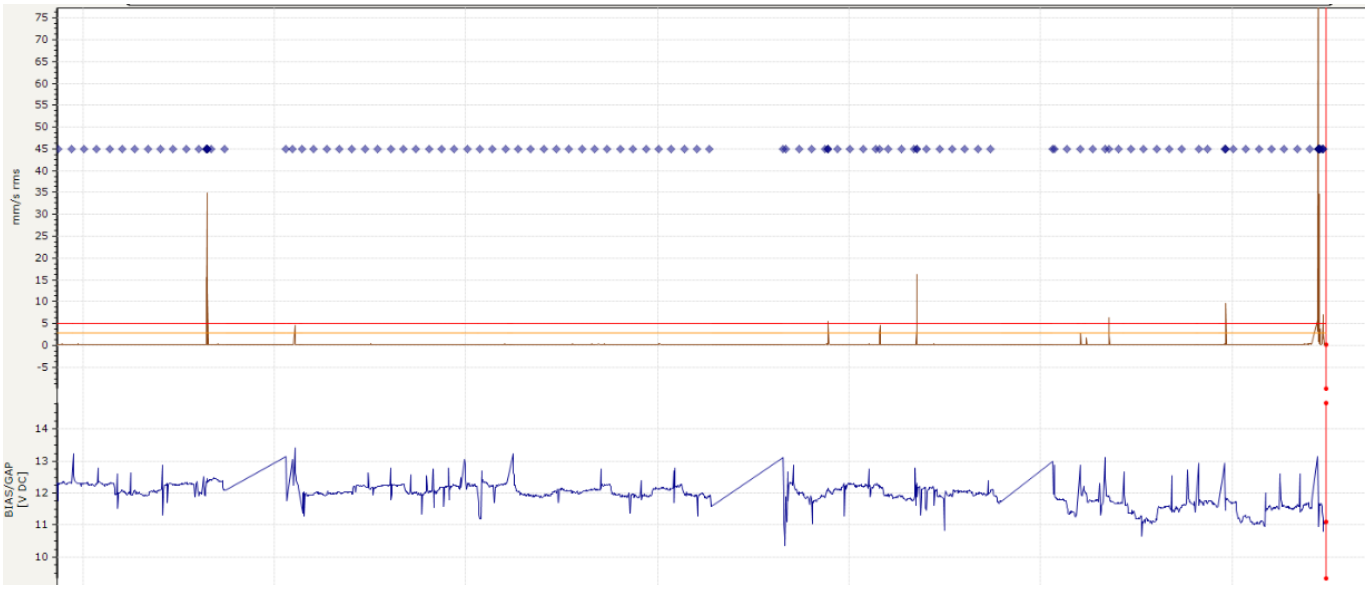


Figure 1

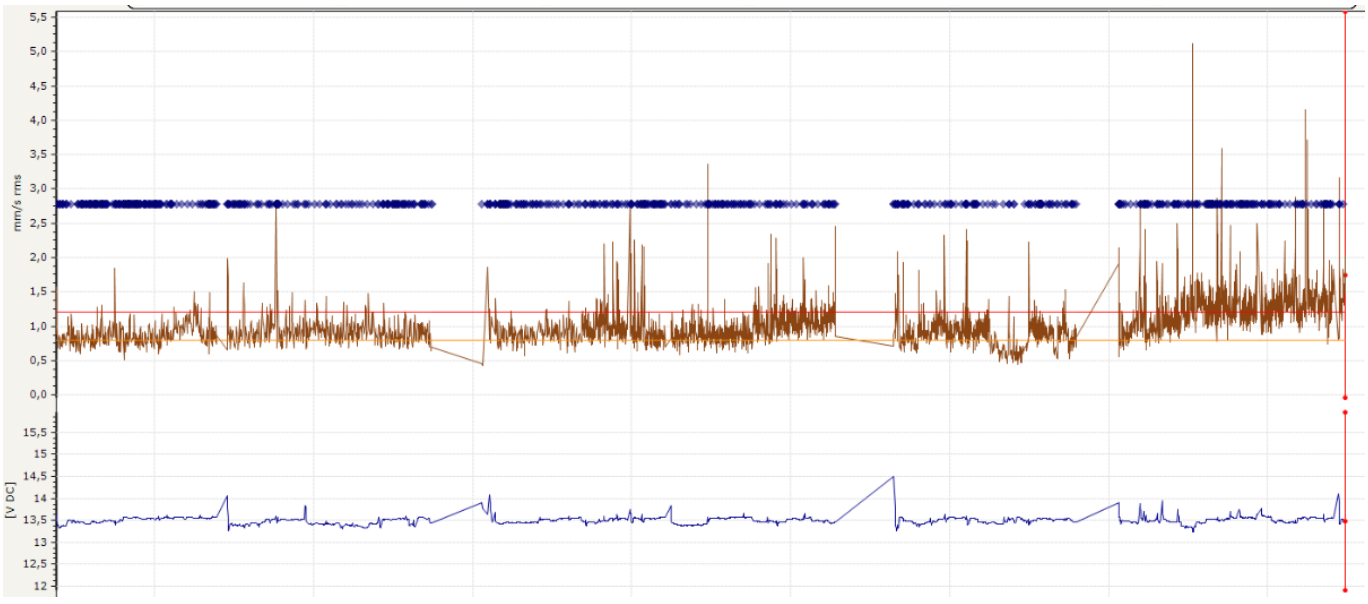


Figure 2

Other measuring points were affected and some showed values well over 20 mm / sec vibration speed.

Figure 3 shows the plot of another drying cylinder. In the meantime, the plant operator had deactivated large parts of his system and replaced large numbers of sensors and cables. By replacing the sensor or the cable, the problems were resolved for the time being.

Figure 4 shows measured values up to 65 mm / sec. When the bias voltage drops, the sensor replacement is clearly visible; from this point in time, the measured values immediately fall into typical ranges.

Almost 5 weeks later, the first atypical signals appear again.

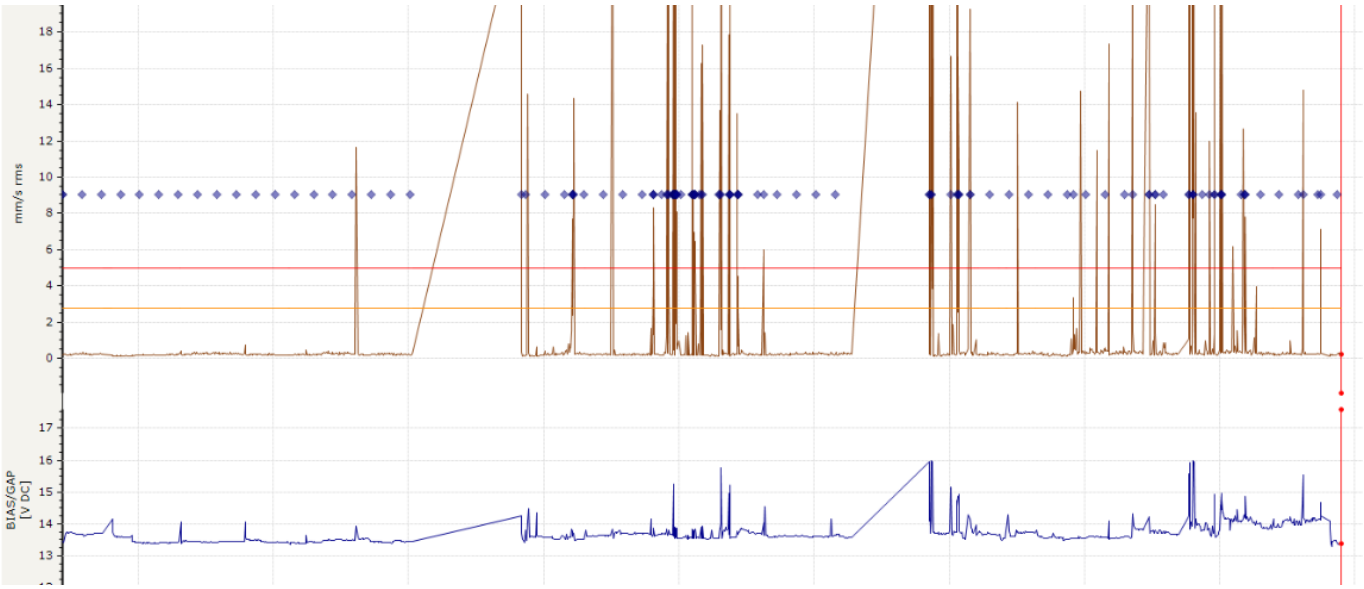


Figure 3

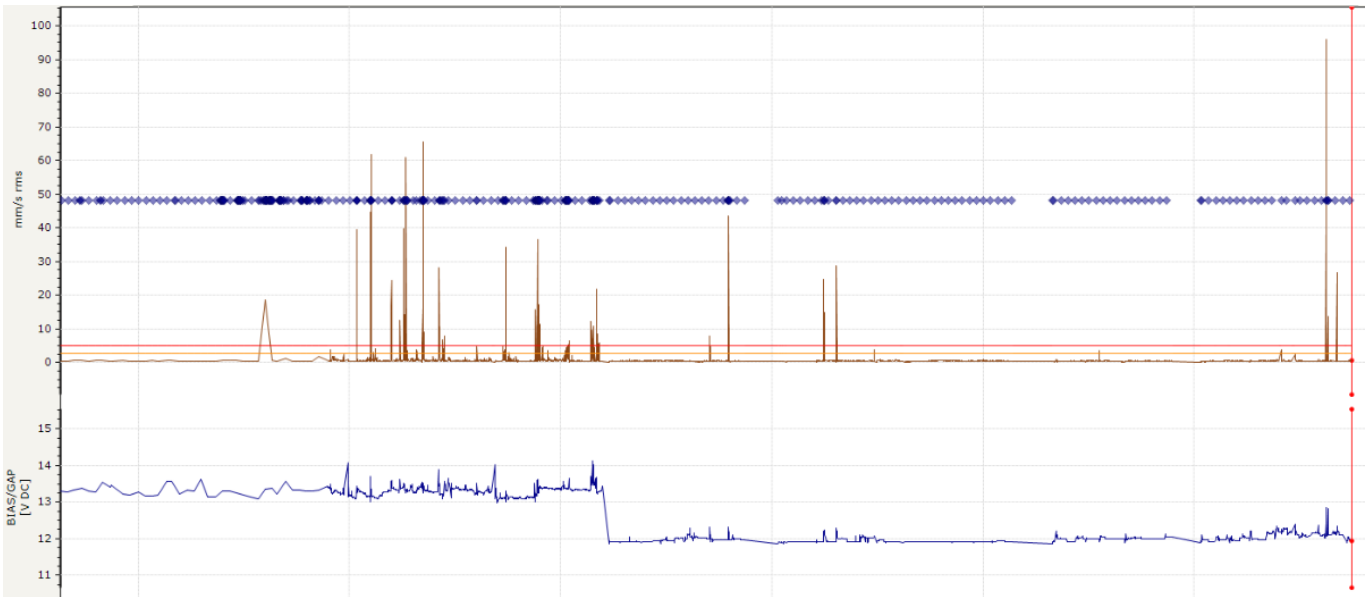


Figure 4

The on-site installation was carried out by an external service provider using self-assembled crimp plugs and silicone cables.

During an on-site inspection and the inspection of the measuring points, it was noticed that the plugs showed corrosion from the inside.
A longitudinal opening of the connector revealed the incorrect processing of the potting material in the connector sleeve. Liquid collected in the cavity. This caused corrosion that ate its way through the connector from the inside. The gradual deterioration in the signal can be traced back to the progressive corrosion. (Figure 5 + 6)

Figure 5

Another flaw was found in the analysis. The cable showed advanced corrosion over a length of 3m.

Figure 6

The temporary improvement of the measurement signal when the connector is replaced. The liquid trapped in the cable diffused through the connector and again caused corrosion.

Figure 7 shows the cable 3m away from the measuring point. This phenomenon was caused by another error during the installation. After installing the cables and plugs, they were left open in the system.

The sensors were installed at a later point in time by another service provider. The machine was started up in the meantime and moisture penetrated the connector.

Figure 7

We therefore recommend always closing open cables with a dummy plug or connecting a sensor.

The cables were subsequently exchanged for pre-assembled FEP cable assemblies on the recommendation of Hansford Sensors.

The measured values showed themselves immediately and sustainably in an expected range. Figure 8 shows the trend of an affected dryer cylinder, four months after exchanging it for a cable assembly.

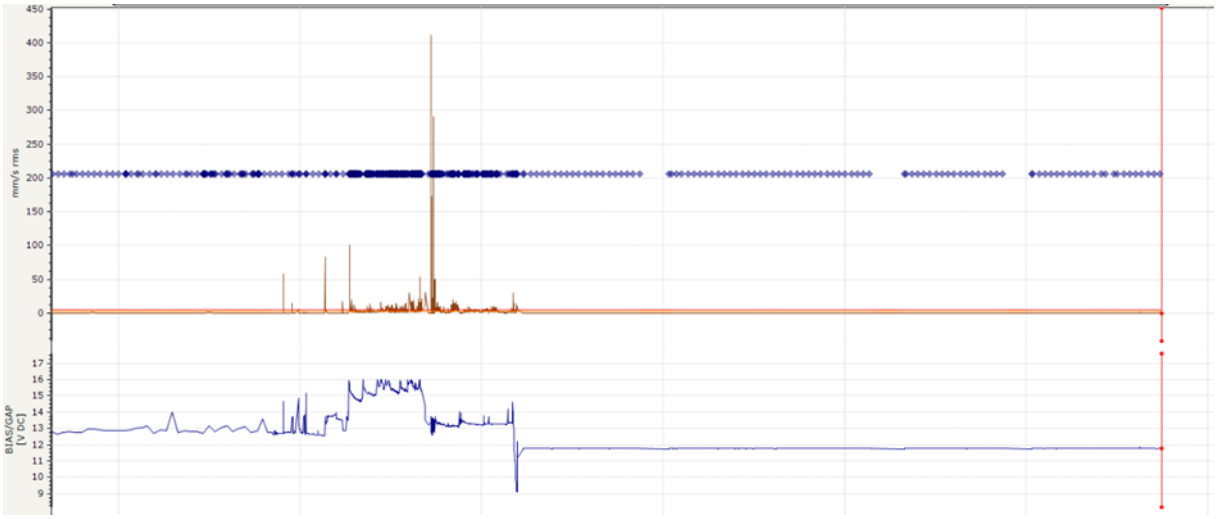


Figure 8

Economic consideration

Provided the self-assembly is carried out correctly and the errors in the example can be avoided, the question of the final cost-effectiveness of self-assembly compared to finished assembly remains.
For further consideration, we use average values for times, installation costs and cable costs.

Assumptions:

⇒ Fitter: £60/Hour

⇒ Time to assemble a connector with preparation and follow-up: 15 minutes

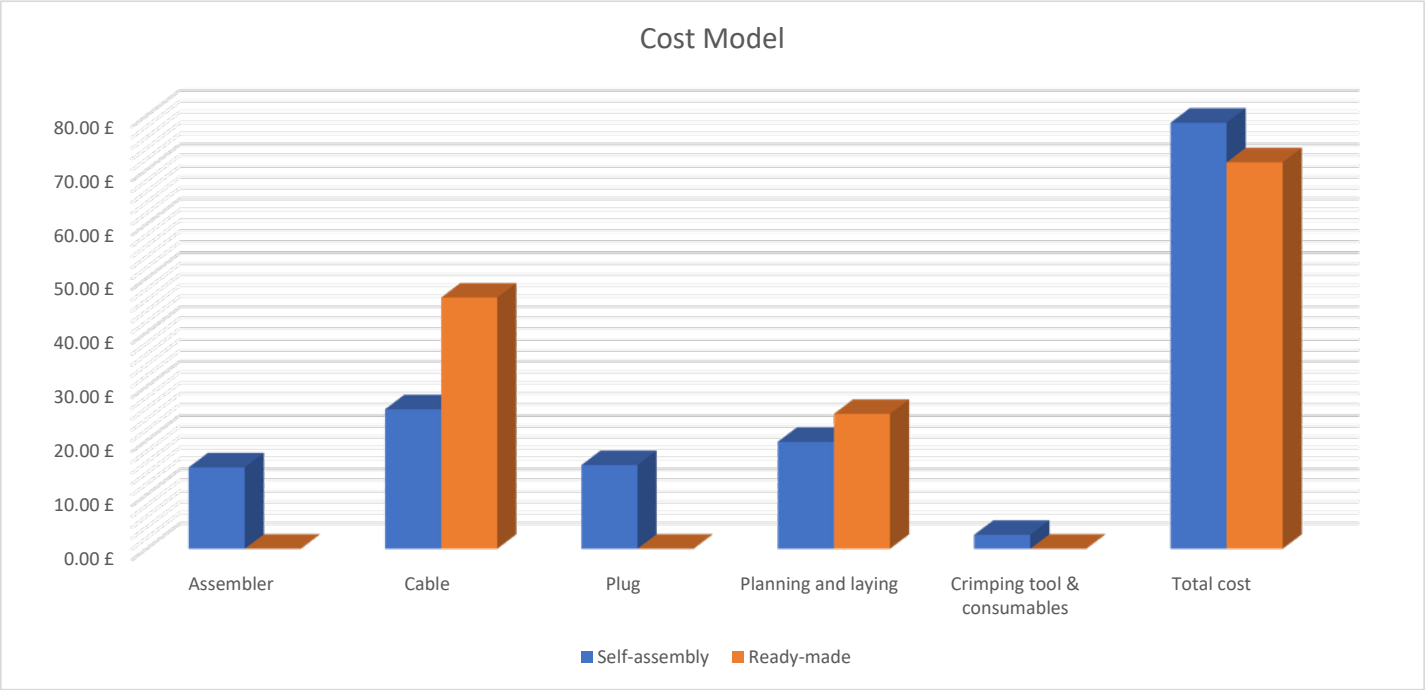
⇒ Cable costs per meter: £2.55

⇒ Channels: 250

⇒ Cable length in section 10m = 2.500m

⇒ Laying the cable with the open end 5 minutes faster than when assembling. Also takes into account the additional planning of the cable lengths.

⇒ Cable price for a 10m prefabricated assembly: £46



In this calculation example, a measuring point with a self-made cable costs £78.69. A measuring point with pre-assembled £71.38. With the 250 measuring points in this example, that would be a total difference and thus a total saving of 9.3% in favor of the pre-assembled cable assemblies compared to assembly on site.

Conclusion and Recommendation

There are good reasons for self-assembly of cables with plugs on site. On the other hand, there are risks from various sources of error and the supposed cost reduction does not apply to most applications. As the example above shows, it can be significantly cheaper to procure pre-assembled cables.

Hansford Sensors will be happy to assist you in choosing the right cable assemblies. We also offer models with purchase on commission, which again significantly reduces the planning effort.