

The installation of composite core conductors is a critical step in transmission and distribution line projects. Composite cores have a very high strength to weight ratio (6 to 10x more than steel) and a very low coefficient of thermal expansion (10 times lower than steel), but the downside of those outstanding material properties is the relative vulnerability of the composite core to damage caused by impacts or excessive bending.

In my 10 years of experience installing HTLS / composite core conductors as a master conductor installer, I've noticed that stringing is generally where issues happen with those conductors if things are not handled properly.

So let's take a look at the main kinds of stringing that can be encountered for the installation of

HTLS conductors, and provide an overview of the specifics of each method.

This first article in our series on conductor installation techniques focuses on manual stringing, a traditional but still relevant method used in specific conditions.

Indeed, while large-scale installations typically rely on specialized pulling and tensioning equipment, there are situations where simpler, more direct methods such as manual stringing are preferable.

Manual stringing refers to the installation of a conductor without the use of mechanical pulling or tensioning machines. Instead, the conductor is handled manually by the crew, typically over short sections of a single span, either between tension towers or from the first tower to the tension structure of a substation.

This approach is especially useful in locations where there is **insufficient space to safely operate stringing machinery**, for example in urban areas, inside substations or in constrained rights-of-way.

Main advantages of manual stringing

Manual stringing offers 3 clear advantages over other stringing methods:

- **Low risk of conductor damage**: since no stringing tension is applied, the conductor is not going through any pulleys or subjected to severe angles.
- **Simplicity**: no heavy or specialized equipment is required, only a reel stand and a controlled manual braking system.
- **Speed of execution**: for short spans, manual handling is often faster than mobilizing and setting up machines.

Limitations and safety considerations

The main drawback of manual stringing is that **it can only be performed in single-span sections between tension structures**. Attempting longer sections without proper stringing equipment can result in damage to the aluminum surface or to the composite core, or safety risks.

By combining careful manual handling with simple protection measures, linemen can safely perform manual stringing without compromising conductor integrity.

Basic precautions include ensuring the conductor is never dragged or crushed. During handling, it should be temporarily supported on wood, blankets, or plastic tarps to protect the annealed

aluminum surface. Moreover, the reel must be placed on a stable stand, with manual braking applied smoothly and consistently.

When to consider manual stringing

Manual stringing is a useful method **when safety conditions, such as electrical distances or maneuvering spaces, limit the use of heavy equipment.**
This technique is not intended for long-distance line construction, but it is valuable in specific installation scenarios, such as:

- Substation connections, especially from the first tower to the tension structure of the electrical substation
- Short-span urban line modifications
- Emergency repairs where machines cannot be mobilized in time

Real world case study : Encuentro – Kimal 220 kV line (Chile)

Let’s take a recent real world example where manual stringing has been used on HVCRC conductors.

In the summer of 2025, Elecnor Chile started installing 120 km of HVCRC 370-47 conductor (Amsterdam size) on a 220 kV line operated by SAESA in the Atacama Desert. Elecnor opted for manual stringing in this remote area due to safety restrictions and electrical distances in some short spans, as the area near the “Encuentro” electrical substation is very congested with other transmission lines that serve mining companies in the region, including other lines that crossed overhead, and safety regulations state that stringing machines must not be placed under energized circuits.



As the HVCRC Master Installer for this project, I travelled onsite in advance on the project to make sure the crew was properly trained and had all the suitable equipment.
Throughout the project, the Elecnor Chile team demonstrated a high level of professionalism and deployed all the good practices mentioned above, as we can see in the enclosed picture: protective tarps on the floor to avoid surface damage on the soft annealed aluminum, stable reel stand operated smoothly and safely, and excellent team coordination at all times to carry and handle the conductor properly.

Several other HVCRC® reconductoring projects are currently being installed in a similar way in India, where it is a popular stringing method.

In the next articles, I will cover other stringing methods, from conventional mechanical stringing

techniques, including the use of pullers, tensioners, and bullwheels, as well as advanced methods for special environments (river crossings, mountainous terrain…).



About the author:
Sergio Rojas is based in Mexico and serves as HVCRC® Master Installer, supporting installation projects throughout Latin America. With a degree in Industrial Engineering, he has built a 25-year career in the transmission industry, taking on many roles such as site manager, quality coordinator, and technical expert on more than 100 transmission line projects across Mexico and various other LATAM countries. After six years as an ACCC® Master Installer, Sergio joined Epsilon Cable in 2022 to lead HVCRC® installations in LATAM and contribute to the

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