



# AN INNOVATIVE INTEGRATED IN-TUNNEL PIPE LAYING SYSTEM

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**Construction Site**

**Lianhuashan Tunnel Project** is located in the heart of Lianhuashan Forest Park ,with a total length of 5.3 kilometers, recognized as a rock-type, extra-long tunnel . It is the longest distance, the most complicated working condition and the most difficult natural gas tunnel in China so far.

In view of this, Deping provided innovative solutions for tunnel construction and it could be summarized as follows:

- 1. Pipe support construction: rebar cage base, anchor fixing, cement pouring**
- 2. Pipe transportation over pipe supports , or modified tractor deliver pipe**
- 3. Alignment and pipe automatic welding--internal welding.**
- 4. Pipe automatic welding---external welding**



## 1. Pipe support construction



Rebar cage base, anchor fixing, cement pouring

## 2. Pipe transportation over pipe supports



The pipes are laid by pipe carriers, modified tractor and cross-over platform



### 3. Alignment and pipe automatic welding--internal welding.

Carrier 2 lifts the base pipe, while carrier 1 lifts the sub-pipe and moves toward carrier 2. Two pipe carriers work simultaneously, to adjust the position of the base pipe and the sub-pipe, then complete the alignment.

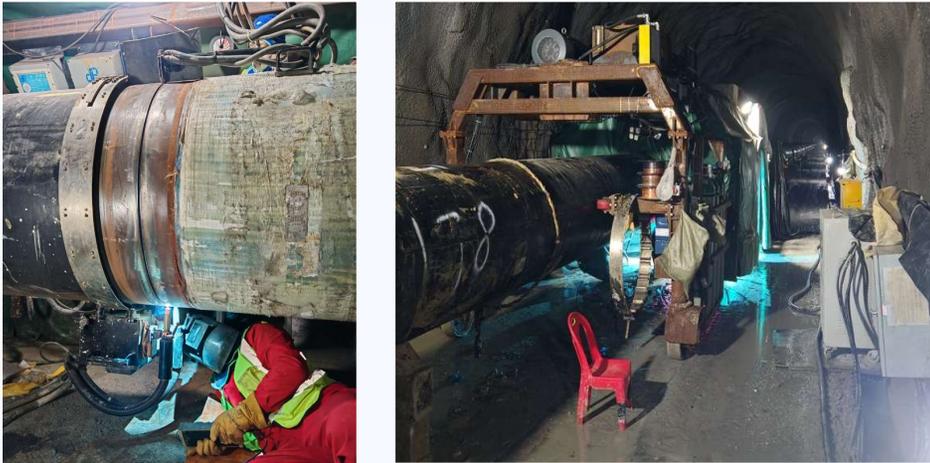


After alignment, the automatic internal welding machine will start welding inside the pipe. After welding is completed, the carrier 2 and the carrier 1 move to the next working position, and the dual-torch automatic external welding station enters the work position.





#### 4. Pipe automatic welding---external welding



There are two or more external welding stations to perform layered welding, each external welding station only welds the welding pass that should be welded by themselves, then move forward to next station, the following welding station takes over and continues to complete the filling of this welding seam.

#### ACHIEVEMENT

- This new process has made technical innovations specifically for restrictive scenarios, can effectively adapt to complex terrains such as mountains and tunnels, complete the constructions more efficient and precise.
- The production efficiency is greatly improved. The speed of dual torch welding matched with the cycle time of pipe alignment and internal welding, which greatly improves the construction speed. The construction time is at least 4 times shorter than before.
- Require less personnel, only 28 people are needed (37 people are needed conventionally), and the staff cost is reduced by about 15%.
- One process can adapt to the entire construction condition, one machine has multiple uses.