CUSTOMER INFORMATION REPORT

TOPIC : How to Overcome Wire Feeding Problems

Wire feeding problems are one of the most annoying and slowing problems in GMAW and FCAW. These problems can be defined as all the failures which block the continuous and proper feeding of wire through the contact tip. These failures will most probably cause the following issues:

- Sticking of wire to the contact tip
- Wire breakage on the feeding rolls
- Changes in the arc length and related negativities such as an increase in the spatter

The followings are the main issues which may cause the wire feeding problems and associated solutions to these problems.

- **Improper pressure of the feeding rolls**: This issue is generally encountered when there is excessive pressure (B)(C) of the wire feeding rolls and results in the deformation and ruining of the circular shape of the wire. Excessive pressure of the wire feeding rolls also cause the material to be chipped (Figure-1) from the surface of the wire. The chips will get into the wire liner and will cause clogging and related feeding problems. The possible mistakes and the associated solutions when adjusting the pressure of the feeding rolls are explained in the figure set below.

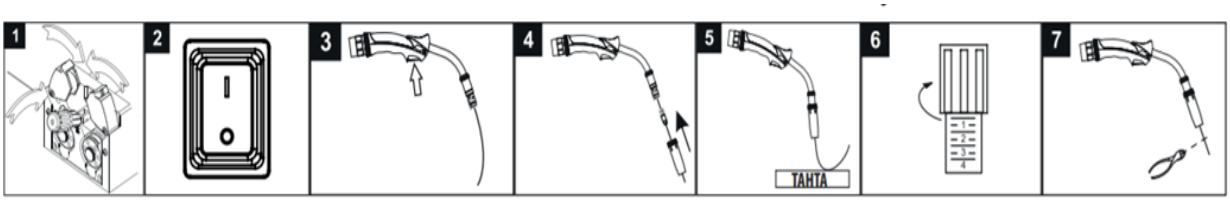


Figure-1 Directions to set the drive roll pressure

1. **Push down the drive rolls and pull up the depressor arm.**
2. **Switch on the machine. Pull the torch trigger to the time the wire can be seen at torch tip, by the way observe the spool if it revolves easily. Then repeat this process to see if there will be any loosening of the wire on the spool.**
3. **If there is any loosening or back winding on the spool, then increase the pressure of the feeding system a little bit.**
4. **When the wire is seen at the torch tip, install the contact tip and the nozzle back. While driving the wire on a wood;**
5. **Set the appopriate pressure.**
6. **And cut the excess wire at the tip.**

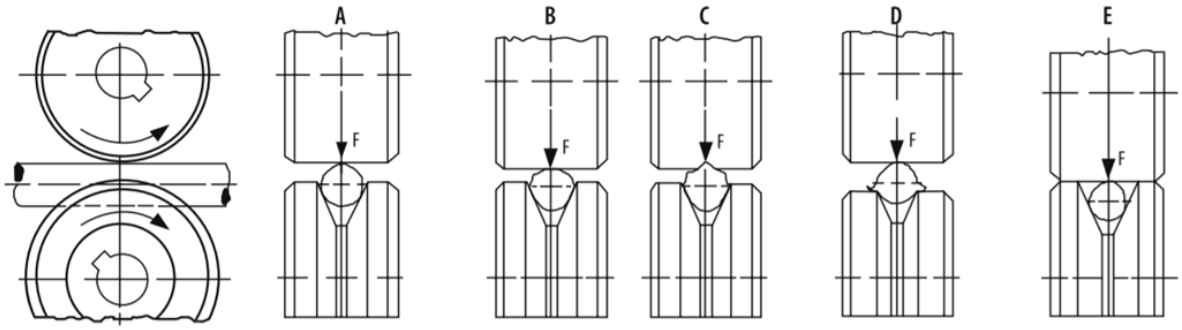


Figure-2 Results of the drive roll pressure on the drive rolls and the wire

A: Appropriate pressure and channel clearance
B: Since there is excessive pressure, the wire deforms
C: Since there is excessive pressure, the driver rolls deform
D: The channel clearance is well below the wire diameter. The wire deforms.
E: The channel clearance is well above the wire diameter. The wire can't be fed.

Picture-1 Excessive drive roll pressure may cause the copper coating to be scrapped off

- **Using wrong type of roll and installing the wrong side of roll for groove clearance:** There are different types of drive rolls which differ in terms of their channel geometry. V groove drive rolls are for hard solid wires such as steel, stainless steel. Provides good grip without damaging the copper coating on solid steel wires. U groove drive rolls are for soft solid wires. These type of drive rolls do not squash the wire and allows a controlled amount of slippage to stop the wire from birdnesting. Knurled drive rolls are for flux-cored wires. They provide good grip on flux-cored wires which usually have a surface lubricant used in order to get better feeding. If flux-cored wires are fed with V groove drive rolls, the feeding process will need more pressure to properly feed the wire. This pressure will crush the wire and change the form of it which results in the fast consumption of contact tips and makes the feeding worse. (Attention: Sometimes welding machine manufacturers can design special groove types for their own machines!) There are generally two groove clearance sides for one drive roll. They are for wires having different diameters. Each of the two drive

rolls shall be installed from the same side which shall be appropriate for the diameter of wire being fed. Greasy and dirty drive rolls shall not be used, instead they shall be wiped off with a clean and dry cloth and used as clean.

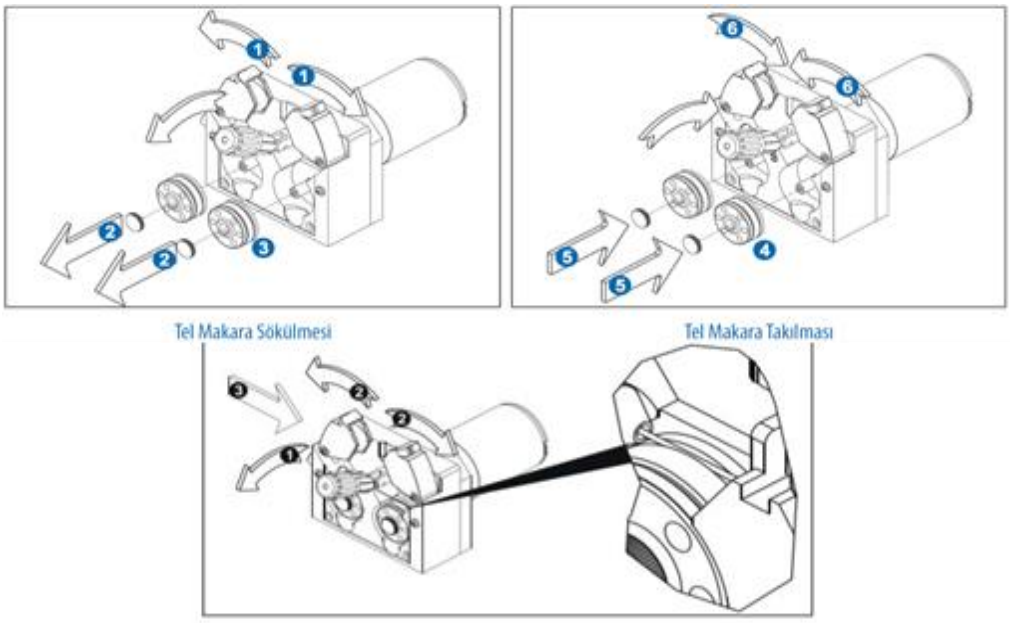
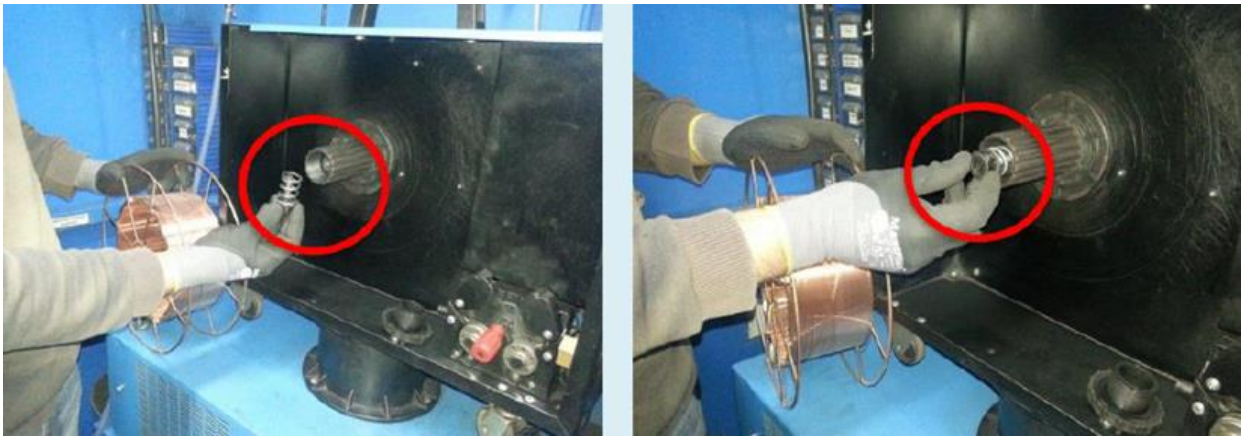


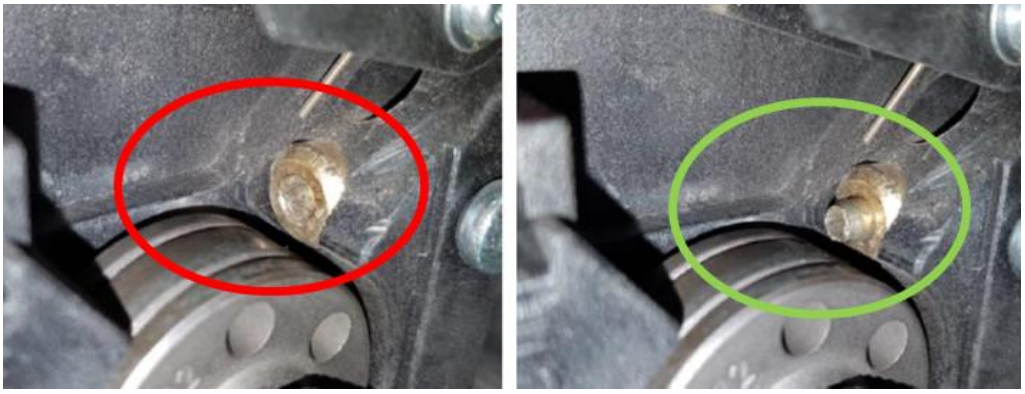
Figure-3 Illustration for installation of drive rolls

- **Wrong setting of torque for break:** Torque screw is placed at middle of the shaft that carries the spool and maintain the angular speed of the spool in a controlled manner. It prevents the wire from getting loose on the spool. If the torque screw is too tight, drive rolls can't feed the wire and wire may stuck. Additionally, it may cause the spool marks on the wire when the spool is about to be consumed. If the torque screw is too loose, the welder needs more pressure than normal to feed the wire properly, ending with abrasion of the wire. (Note: Torque screw may be different for any machine, it is a different part than the holder which fix the spool to the wire feeding unit).



Picture-2 Screw for torque adjustment

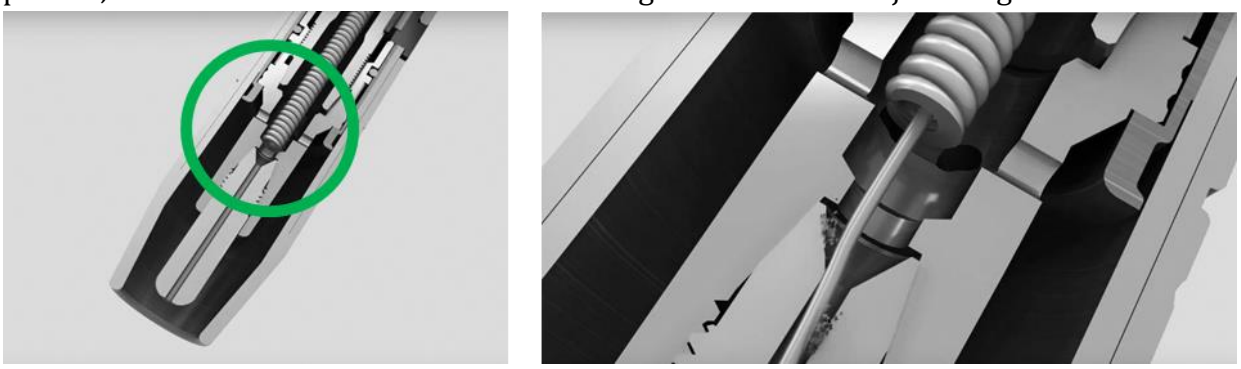
- **Wire feeding without wire guide:** A wire guide is a connection between the socket of torch on machine and drive rolls. It is generally made of copper and its alloys and used for the alignment of the wire to prevent scratching of both the wire and coating of it due to increased friction from contact points of wire to equipment. (Picture-4)



Picture-3 Left: no wire guide Right: wire guide is attached

Picture-4 Left: wire guide Right: chip formation

- **Too short liner length:** Liner should be long enough to a distance from machine exit to contact tip. Special care must be given to cutting the liner at 'trigger' part of the torch. If it is cut too short it will cause wire jamming, wire breakages etc. As it can be seen from the picture, a too short cut liner will disturb the alignment and cause jamming.



Picture-5 Left: mounting the liner correctly Right: too short liner is mounted

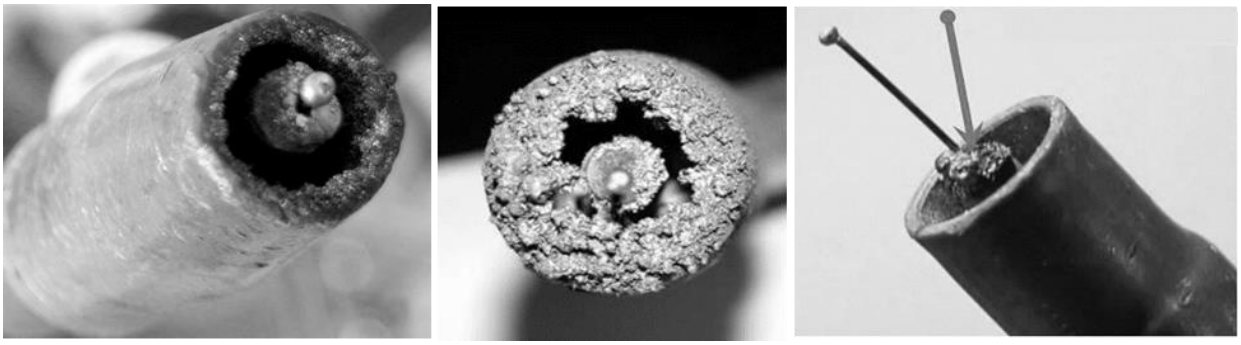
- **Physical form of torch:** It is very important for a wire to experience as minimal friction as possible in order to obtain a flawless welding operation. To do so, you should aim for a torch that has minimum 60 cm diamater bent, otherwise due to increased friction, wire will experience problems in feeding.

Picture-6 Excessively bent torch, wrong torch form

- **Contact tip selection:** Wire diameter and contac tip diameter relation is important at this point since a too big contact tip (lets say 1.40 mm or 1.60 mm) for a wire (e.g. 1.20 mm wire) will cause trouble in welding such as excess spatter and accumulation in both nozzle and contact tip, due to unstabilized arc thus sticking of wire to the contact tip. Same thing applies to too small contact tip selection which causes increased abrasion of contact tip and wire feeding troubles. Our advise is to select the appropiate sized contact tip to wire diameter being used. In case of a need for a contact tip with enhanced wear properties of prefer Zirconium (Zr) alloyed materials.

Picture-7 Unalloyed (a) and Zr alloyed (b) contact tip

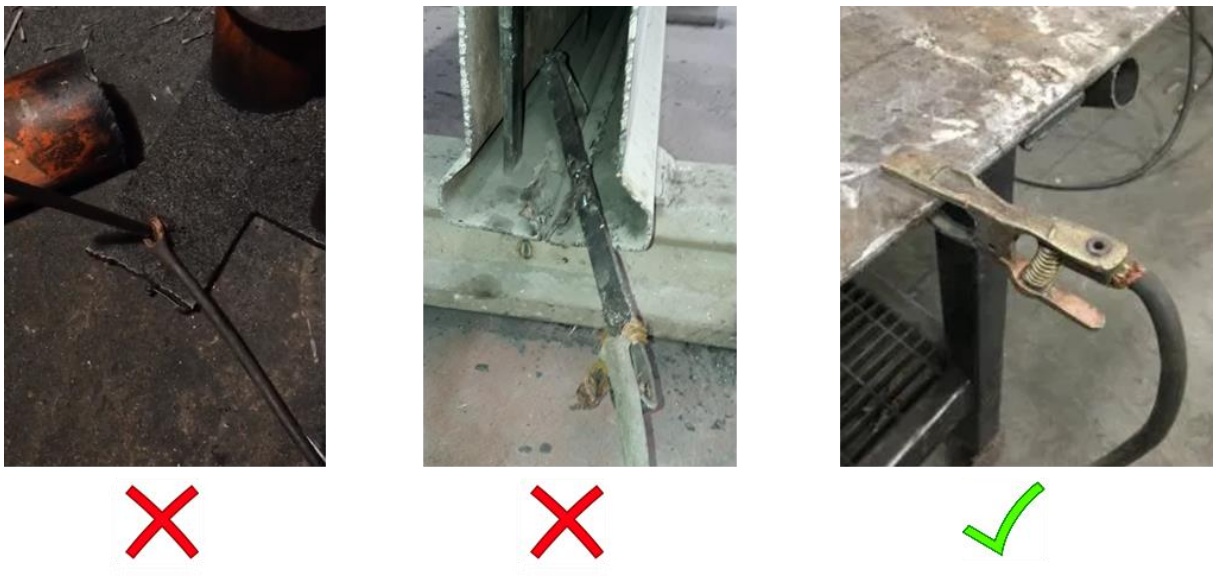
- **Cleanliness:** Spatters sticking to contact tip or nozzle, metal dusts in both wire liner and drive rolls increase the severity of wire feedability problems. Spatters must be cleaned with wire brushes during shifts or more frequently. Drive rolls and steel liners must be cleaned with compressed air in daily or weekly basis.



Picture-8 Pictures of nozzles and contact tips which require cleaning

- **Equipment check:** Welding Machine and the parts connected to it should be checked on a regular basis. Worn or old parts must be replaced. Worn/Used liners cause wire to jam, roll pressure setting won't be optimized due to worn drive rolls and abrasion in contact tip will impair the arc stability. Special care must be given to clamp and plier cables if either worn or so decayed that the copper conductor can be seen, they should be replaced with the new ones. Clamps that are unable to grip the work piece should not be used. **Do not hammer the contact tip in pursuance of better wire feedability!**

Picture-9 Do not use the contact tip as it is hammered!



Picture-10 Pictures of wrong and correct clamping