



Being curious is a human characteristic. In any chapter of life - both in our private and professional. Curiosity is needed to learn, to understand, to develop. It's the ignition to get in touch with a new or not yet well known Technology. Like Pulse Laser Welding, which is a game changer in maintenance and refurbishment.

The core of the curiosity is called the **Golden Circle of Pulse Laser Welding**.



Our curiosity guides us to the very first and most relevant questions :

WHY Pulse Laser Welding is needed ?

Followed by :

HOW Pulse Laser Welding can provide its unique advantages ?

WHAT are the applications of Pulse Laser Welding ?

This handbook provides answers to these and many other questions that arise from curiosity about „Welding with pulsed Light and its Speed“.

The most easiest way to get in touch with PLW-Technology is the question :
„**HOW** classical arc-welding technologies works?“



HOW classical arc-welding technologies works ?



GTAW



GMAW



SMAW

Classical arc-welding methods use electricity.

They continuous provide heat until the metal melts until the needed melting pool is present.

By applying continuous heat to metal causes some negative effects :

- Microstructure Changing
- Coarse Grain Formation
- Graphitisation
- Thermal Distortion
- Residual Stress
- Brittle Structure in the Heat-Affected Zone (HAZ)
- Unacceptable Welding Discontinuities and Defects

And for some materials it requires :

- Pre- or Post Weld Heat Treatment (PWHT)



Conclusion : Classical arc-welding methods provides negative influences regarding mechanical- and metallurgical properties.



HOW Pulse Laser Welding technology works ?



Pulse Laser Welding creates the melting pool by pulsed Light and its Speed by Photons - travels at 300,000 km/s.

Pulse Laser Welding is happen within a split of second means :

- Release energy supply ...
- Create the molten bath ...
- Add filler material ...
- Stop energy supply ...
- Complete solidification of the molten bath ...



... while **all unique advantages** are provided.



Pulse Laser Welding Process
1.) Original Speed
2.) Thermo Camera
3.) Super Slow Camera
Video DSI-Dropbox

Based on always full metallurgical bonding :

- ✓ Very low heat input (only about 30 Joules) / very thin HAZ (0.1-0.3 mm)
- ✓ No critical microstructure changing / No coarse grain formation
- ✓ No pre- or post weld heat treatment / welding at room temperature
- ✓ No graphitisation / related to welding (gray) cast iron
- ✓ Almost no thermal distortion / very precisely



Conclusion : Pulse Laser Welding does **NOT** provide negative influences regarding mechanical- and metallurgical properties.