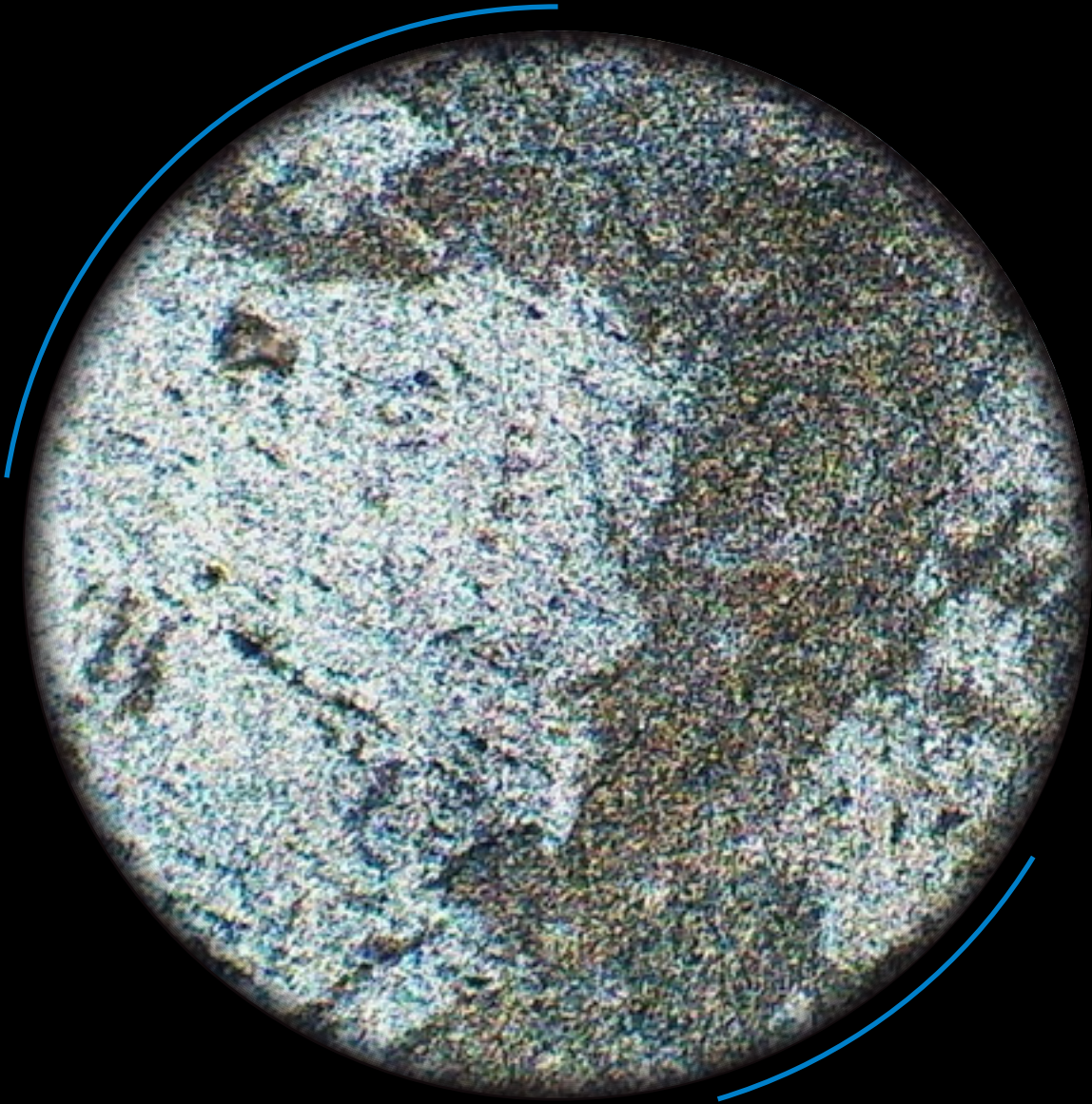




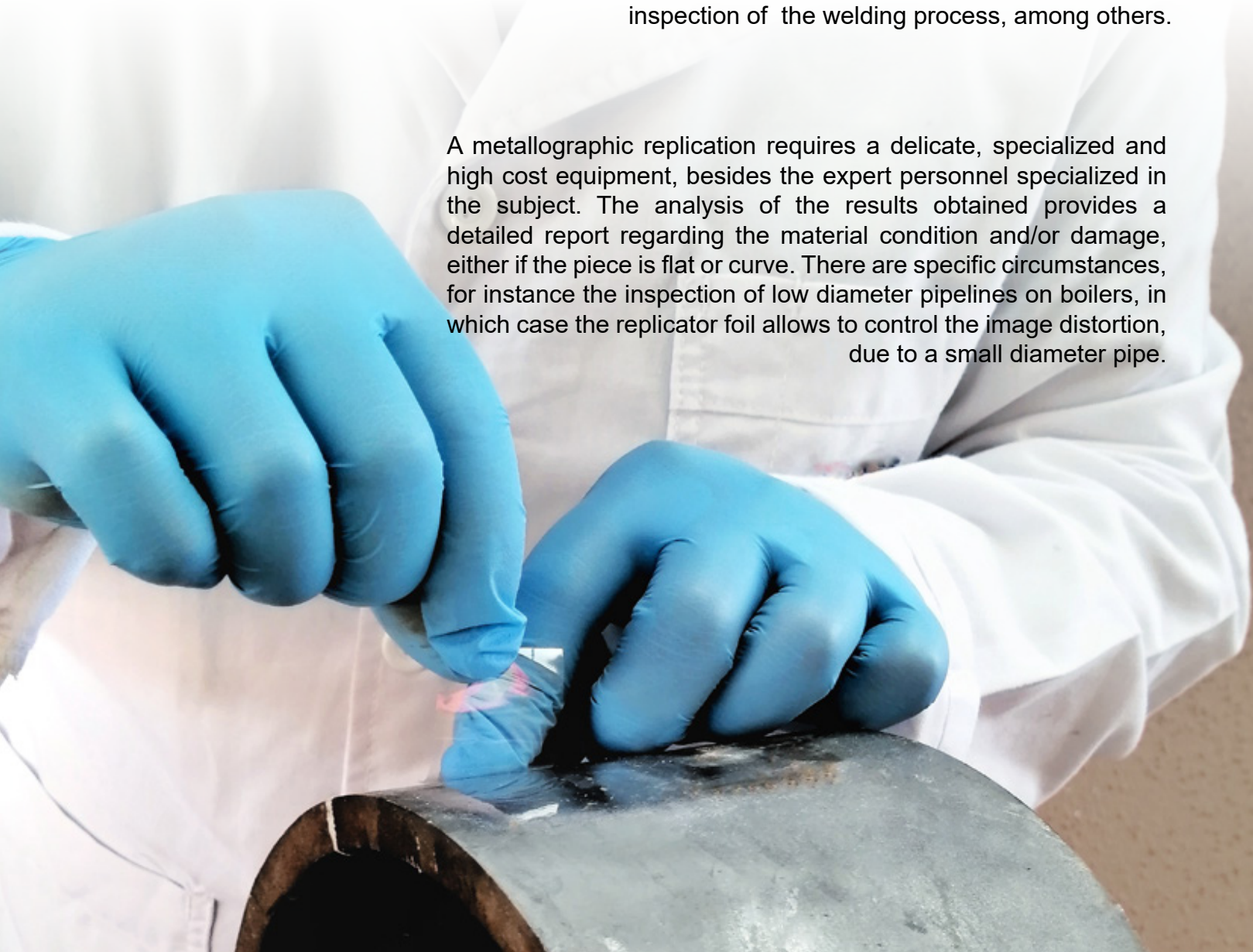
Metallographic Replication

A Metallographic Replication is a non-destructive method used to explore specific material microstructure changes and to perform an analysis of its current condition. It allows to make an outreach of the residual life of the analyzed material as to programme future maintenances.

“Non-destructive” refers to the ability to keep the integrity of the analysed material without damaging it, as it occurs in a conventional metallographic, where a piece of the material is used as a sample. It is not necessary wait the for sample to be delivered to the laboratory and then performing any treatments in order to obtain the metallographic image. The non-destructive metallographic techniques allow to observe and examine the sample in situ, the analysis is carried out in the same plant, and conclusions can be made immediately.

Techniques can be applied to a wide variety of a ferrous or not ferrous metallic materials. Today, its main uses are power plants, petroleum pipelines and natural gas. Also the quality inspection of the welding process, among others.

A metallographic replication requires a delicate, specialized and high cost equipment, besides the expert personnel specialized in the subject. The analysis of the results obtained provides a detailed report regarding the material condition and/or damage, either if the piece is flat or curve. There are specific circumstances, for instance the inspection of low diameter pipelines on boilers, in which case the replicator foil allows to control the image distortion, due to a small diameter pipe.



PREPARING THE SURFACE TO ANALYZE

Once the requisition is received, a SolCoLab® team, leading by a wide experienced Metallurgical Engineer, will visit your facilities and will analyze the piece to be inspected, isolating the section to be analyzed with no cut nor withdraw.

The surface will be prepared utilizing a sanding and metallographic polishing procedure; this method meets and surpasses in many ways the international regulations, which is highly precise to obtain a representative high quality image of the analyzed component and its metallurgical condition.

At this stage, several types of metallographic sandpapers are needed, while for polishing it is necessary to use polishing wipes of up to 0,25 mic and high quality additives, such as diamond paste and metallographic lubricants.

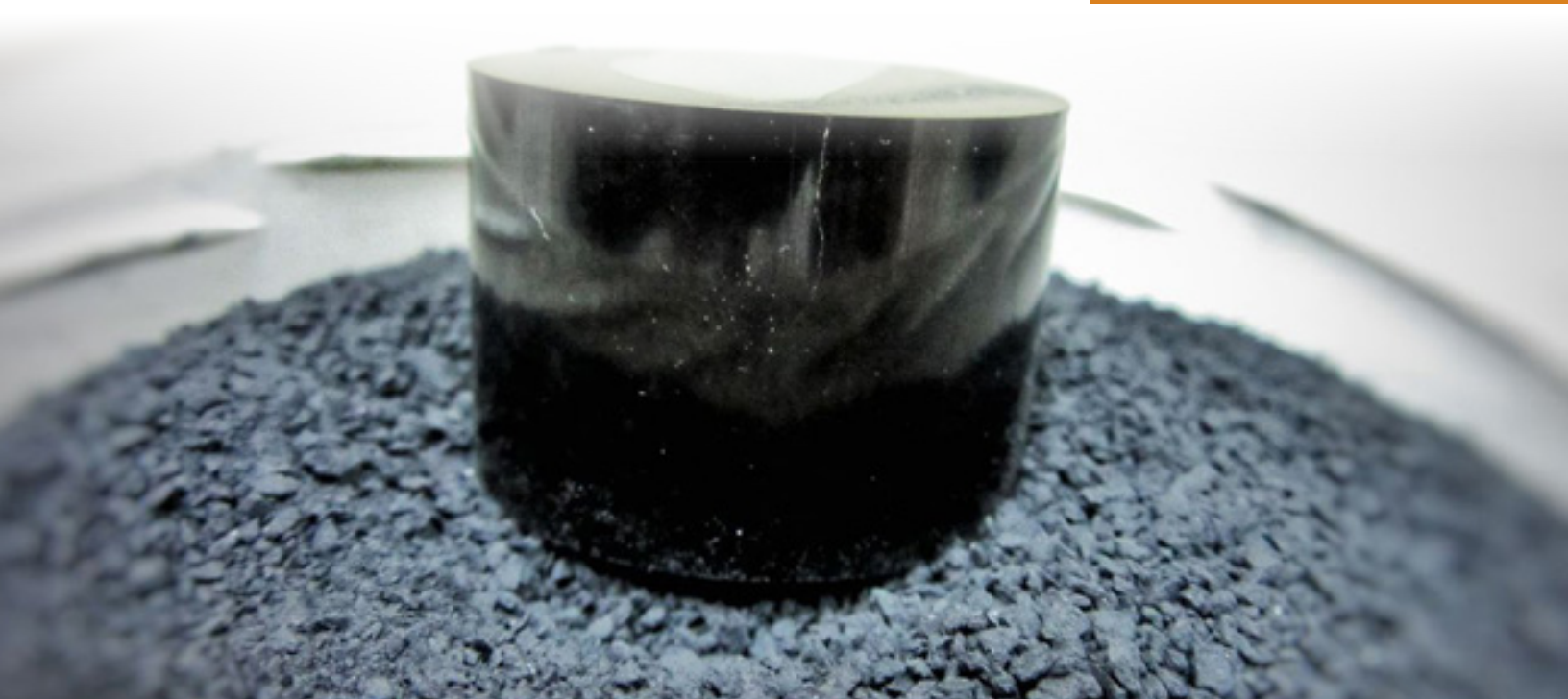


CHEMICAL / ELECTROLYTIC ATTACK

Once the surface is metallographically polished, we proceed to carry out a chemical or chemical-electrolytic attack, with an usually acid solution, which has been specifically formulated for the metal type to be analyzed and the microstructure type we want to reveal.

Some types of alloys and microstructures need what we call chemical / electrolytic attack, which requires power regulated sources, and in-situ solutions.

Our attack method is the most appropriate for special alloys, such as 304H, 316L, 316MoL, 347H steel, duplex, super duplex, non-ferrous alloys such as copper, aluminium alloys, nickel based alloys, nickel-cobalt, among others. A typical example is when we look for the micro-constituent's content analysis, as the sigma and delta phase, chromium carbides, tungsten, titanium, precipitates and many types of inclusions, which could affect the mechanical properties, component temperature and anticorrosion resistance, besides of being a reflect of the component residual life, under specific work conditions.



MICROSCOPY

We are equipped with high performance and quality ground microscope, German manufactured, which bring us a magnification up to 1200X. Furthermore, our microscopies can be attached in a simple and secure way to any surface, no matter its angle or if it is a curve or plain surface.

Due to its wifi metallographic image capture mechanism, the results may be forwarded in real time to any mobile or stationary device, which allows us to share them with specialist metallurgists are carrying out the same analysis in the whole world and are part of SolCoLab® team. By doing so, we can contrast viewpoints, providing a prompt, accurate, unbiased and committed result requested by our customers. This is what makes SolCoLab® a distinctive company, its human teams and in situ materials.

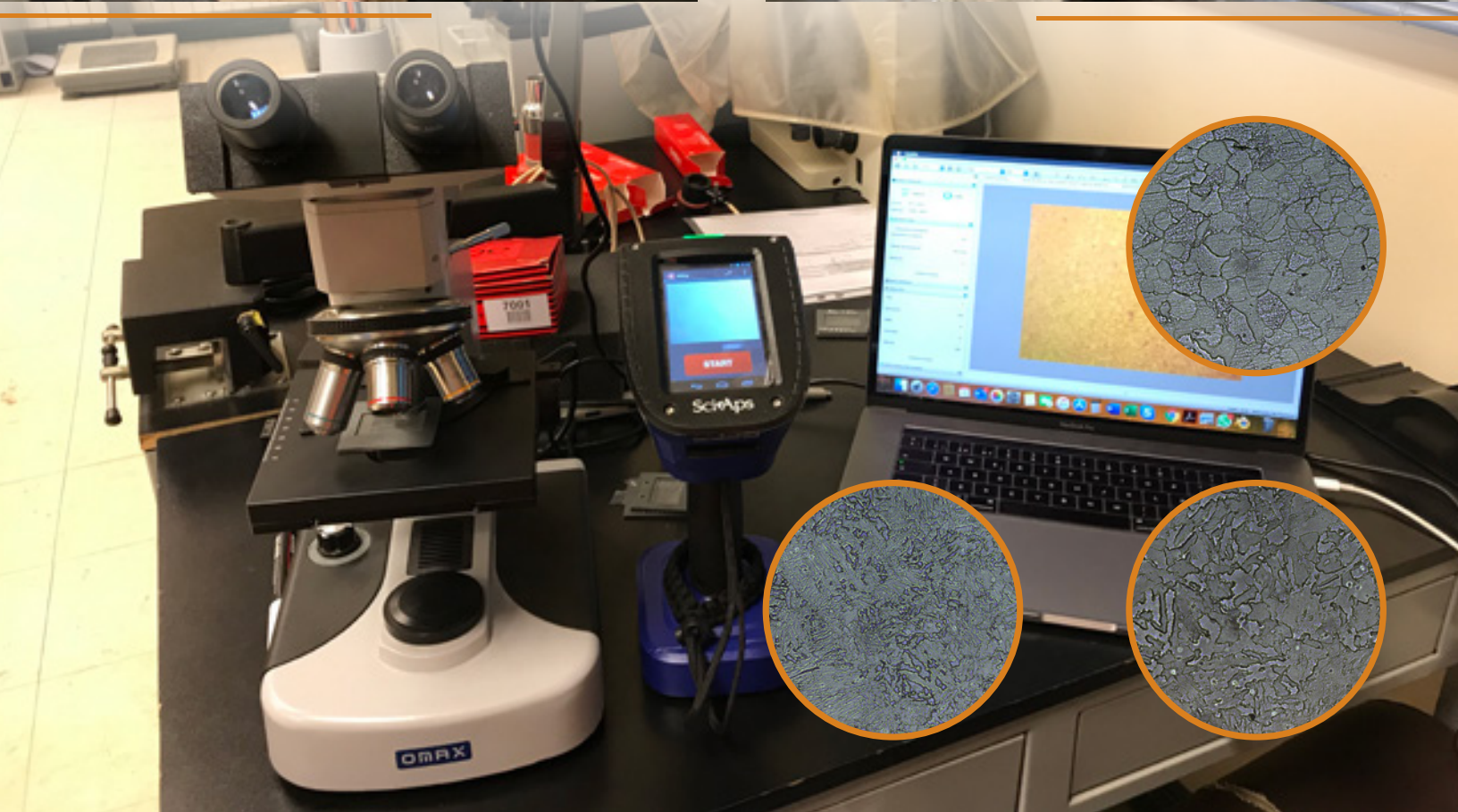
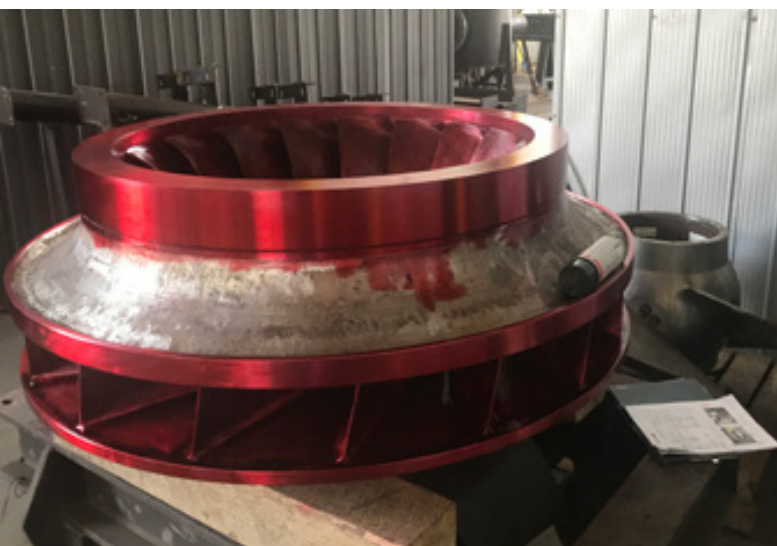
Physical samples, metallurgically replicated and in situ obtained, enable us, where necessary, to perform an analysis in our laboratories, save files for a customer or send it to a third party who will be capable of contrasting their viewpoints as an analysis contribution.

We carry out the analysis of the obtained digital images through our metallographic software, which allows us to observe the microstructural phases, phases counting, calculate the particle size as for ASTM E112, among other features such as coating thickness dimensional measurements, cavity counting in particle edges for creep measuring and the micro-breaks lengths measurement.



RESULTS

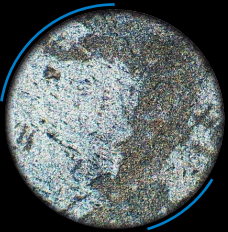
Finally, our metallographic specialists carry out the appropriate recommendations for recovering, repairing or definitive replacement of the analysed part, providing the customer a detailed report with the achieved results and the residual life of the component.



SolCo Lab[®]



Materials & Failure Engineering



Metallographic Replication

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