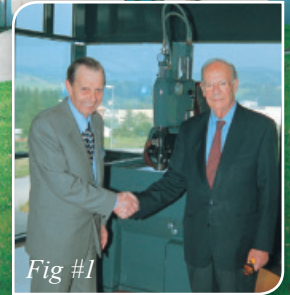


ONA ELECTROEROSIÓN

EDM IS THEIR *ONLY* BUSINESS!

2001 Photo of ONA founder Karmel Onandia (Right) standing with renowned Russian EDM researcher Professor Boris Zolotikh, a member of the Lazerenko team.



In mid-June, EDM Today traveled to Durango, Spain, located in the Basque region, to visit ONA, the world leader in large and customized EDM's and Europe's second largest EDM producer. Basque Country, as it is often called, is located along Spain's northern Atlantic coast in the western Pyrenees that span the border between France and Spain. The Basques are a proud, tough people, with a strong determination to preserve their national character. The location of ONA in Basque Country is significant because the Basque region accounts for approximately 85% of Spain's machine tool production. This high concentration of machine tool producers provides an important infrastructure of subcontractors and suppliers necessary for machine tool production, all within a compact area.



Fig #2 The original ONA factory

History

ONA was founded in 1952 by four members of the Onandia family (the first three letters of their surname forming the company name) as a producer of a variety of small machine tools. In 1955, ONA began a rich history as an EDM builder (See Fig #2):

1955 – Under license from the US company Elox, ONA produces its first Sinker EDM, Model WSM-4.5. (See Fig #3)

1963 – ONA begins production of their second generation Sinker, the CM Series.

1967 – ONA introduces their first family of Sinker EDM's with transistorized generators, the BA Series.

1977 – ONA develops its first family of Wire EDM's, the EBAGOKI Series under license from Elox.

1981 – ONA develops the CNC POLISPARK and the ONA S2000 generator for exclusive use in ONA machines.

1985 – ONA launches the first generation of large "gantry type" Sinker EDM's with electrode capacity of up to 3,000 kg.

1992 – ONA opens their new 15,000 m² production site.

1992 – ONA develops a new generation of Wire EDM's 100% designed by ONA, the ONA PRIMA series.

1999 – ONA introduces its first generation of large Wire EDM's with workpiece capacities up to 10,000 kg.

2009 – ONA launches two new families of large Wire and Sinker EDM's with modular design and the possibility of twin heads.

2015 – ONA introduces its Premium Wire EDM with new CNC and Generator technology.



Fig #3 The first ONA EDM

Fig #4 The ONA showroom



ONA Today (See Fig #4)

ONA is still a family owned company that concentrates solely on EDM. To date, ONA has produced more than 14,000 EDM's that are in use in over 60 countries. ONA builds 90% of its machines for export and has fully staffed subsidiaries (sales, service, parts, and technical support) in Portugal, France, Italy, China, and the USA.

ONA's customers are mainly from the following sectors:

- 65% mold and tool manufacturing, mainly for the automotive industry.
- 15% turbine component manufacturing for the aeronautic and energy generation sectors.
- 10% general mechanics.
- 10% others (aerospace, education, medical sector, etc.)

Design

ONA designs and builds all of its EDM's at the Durango facility under ISO9001 and ISO 14001 registrations. ONA commits 8-10% of its annual turnover to R&D and 20% of its staff is engaged in R&D activities.

ONA's technological capabilities are founded on many years of experience in R&D activities, and they have gained a benchmark reputation with the investment and growth of their Research and Development unit since 1980. The aim has been to remain technologically independent in order to keep the company at the forefront of the electrical discharge machining and solutions market. The main areas of R&D are:

- Filtration and mechanical design
- Power, digital, and analog hardware design (See Fig #5)
- Software design
- Process technology development

ONA enhances its own R&D activities with regular collaboration with European technical institutes:

Germany:

- Laboratory for Machine Tools and Production Engineering (WZL) at the RWTH Aachen University

Spain:

- University of the Basque Country (Engineering Faculty Mechanics Department in Bilbao)
- IK4-Tekniker Research & Innovation Corporation
- Tecnalia Research & Innovation Corporation



Fig #5 ONA engineer fine tuning the discharge pulses on the generator for their new AV25 Wire EDM



Fig #7 Machining an ONA Modular machine base. Note that the dual head machining center works on two opposite surfaces simultaneously.



Fig #6 Pouring the casting for a large ONA machine tool base. For castings this large, a simultaneous pour from two crucibles is required.

Production

OK, let's head out to the factory and see how they build 'em!

Like all high quality machine tools, ONA EDM's start off with certified castings, poured at a foundry in Durango. (See Fig #6) The castings are thermally stress relieved to assure long term stability. The castings are then machined at Euzko, an associated company also mainly owned by the Onandia family. (See Fig #7) The castings are then brought to the ONA Durango factory for highly precise grinding of all locating surfaces to assure correct machine geometry. (See Fig #8) At this point, ONA

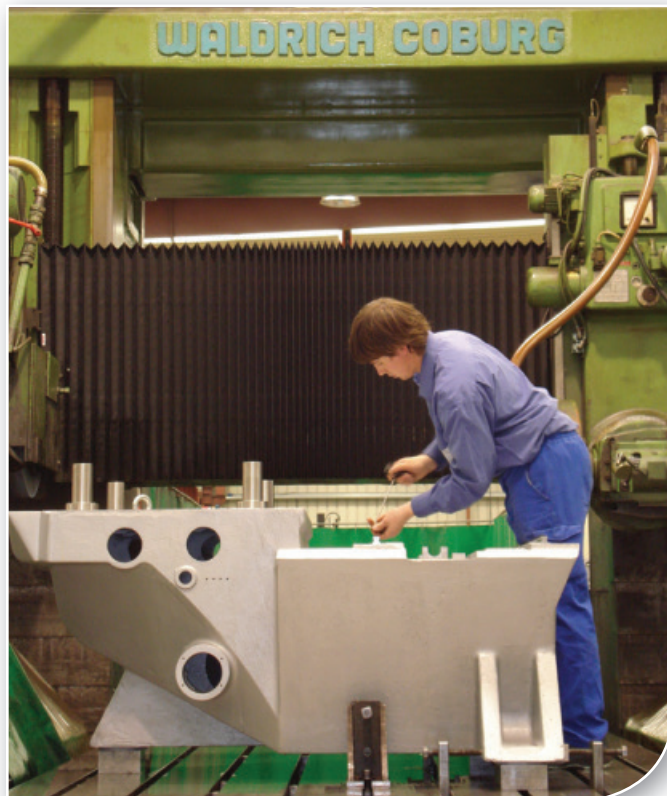


Fig #8 Grinding critical casting surfaces after machining.



Fig #9 One of a number of four man teams that assemble ONA EDM's.

departs from traditional machine assembly by having a team of four craftsmen (See Fig #9) assemble all aspects of the machine build from beginning to end, from casting to electronics. Each team is constructing four machines at any one time. This team based machine building approach is designed to assign personal responsibility for a machine's quality to the team as well as provide a work atmosphere that is interesting and motivating for employees. For each machine, there are holding areas where kits of subassemblies, pumps, motors, boards, glass scales, and other parts are delivered. (See Fig #10, Fig #11, Fig #12)

A note about critical sourced components:

A machine tool is no better than the sum of its externally sourced components. ONA sources all of its critical components from internationally renowned suppliers, many of which are located within a 100 mile radius of the ONA factory, including:

- Castings – Fumbarri | Durango, Spain
- Ball Screws – Korta | Zumaia, Spain
- Linear Guides – INA Schaeffler | Germany
- Glass scales and encoders – Fagor | Mondragón, Spain
- Axis motors and drives – Sanyo Denki | Japan
- Motors for wire kinematics – Parker | Czech Republic
- Pumps – Grundfoss | Hungary



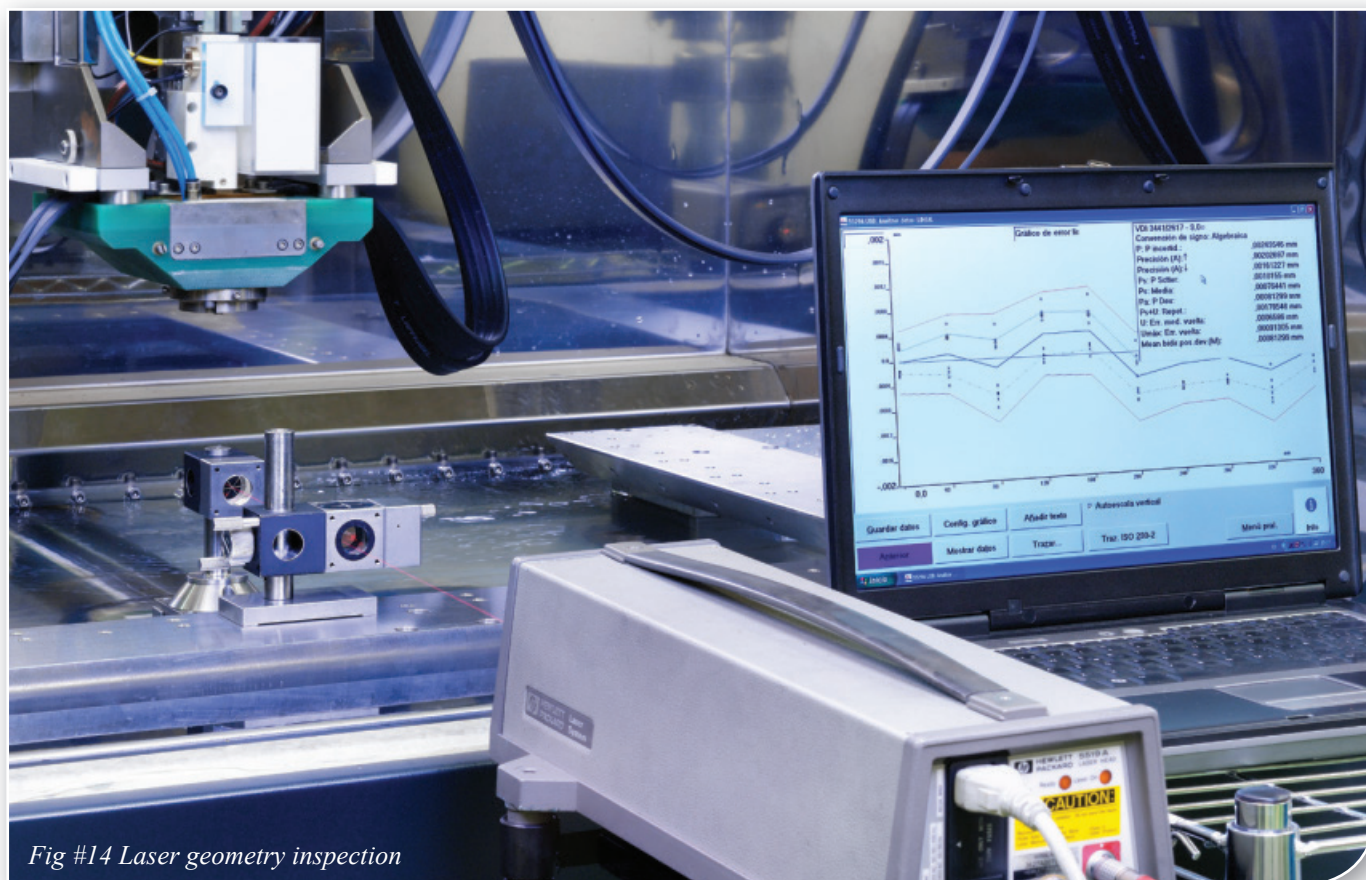
Fig #10 Electrical cabinet assembly



Fig #11 Machine tool assembly



Fig #12 Modular machine tool assembly area



When control cabinets are completed, they are hot tested and cycled in test stands for 24 hours. (See Fig #13) After final assembly, machines are laser checked for final accuracy. (See Fig #14) It is important to note that any reference or squareness deviations are corrected mechanically, as ONA strongly believes that electronic compensation should not be substituted for critical mechanical accuracy. After geometry inspection, all machines are tested by actually burning parts for a minimum of 72 hours.

ONA Culture

ONA is a familial company. That statement means far more than just family owned and managed. (Joseba Onandia, grandson of one of the four ONA founders, is the company President.) The ONA family also includes its employees, its community, its customers, and its vendors. Fig #15 is a photo I took of the mural painted on the wall overlooking the ONA engineering department. A careful study reveals words that you don't often find in most companies' mission statements. Words like: valor, commitment, partnership, integrity, service, excellence, leadership, and trust are more than just a corporate slogan at ONA. They truly define the company. ONA's mantra is "Permanent cooperation with the customers building lasting partnerships based on trust." They back this up by providing a highly qualified and experienced team with a deep understanding of different industries, processes, technologies and materials that works closely with customers from the time of first contact to many years beyond the machine purchase. In fact, one fourth of ONA's employees are directly involved in either service or technical consulting support.

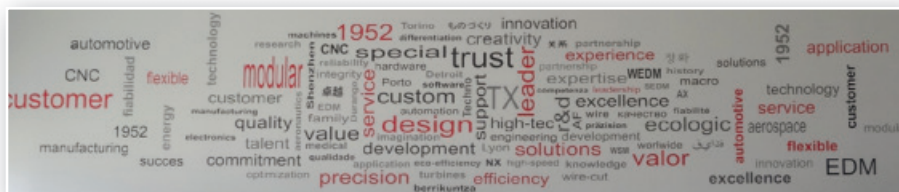




Fig #16 ONA Modular Wire EDM with highly rigid construction

Modular Concept (See Fig #16, Fig #17)

As the world leader in large and customized EDM machines, ONA became acutely aware of the long lead time and extra costs related to the design and manufacture of large, customized machines. Thus, in 2009, ONA introduced the concept of

Modular Large Wire and Sinker EDM's. By utilizing standardized building blocks for machine bases and pre-built axes modules, ONA can assemble numerous combinations of these elements to produce machines that meet customers' exact requirements, often producing a custom system for the same price and lead time as a standard one.

For Wire EDM's, the Modular concept allows the configuration of 20 different large machines from basic building blocks of various X, Y, and Z travels.

For Sinker EDM's, the Modular concept allows the configuration of 40 different large machines from basic building blocks of various X, Y, and Z travels along with custom tank sizes.



Fig #17 ONA AF130, the world's largest standard modular Wire EDM installed at Utimesa, an ONA customer located about an hour's ride from the Durango factory. This machine has travels of X 2,000mm, Y 1,300mm, Z 700mm. The machine will be used to cut components mainly for the energy industry. Note the garage door sized opening in the ceiling of the climate controlled EDM room to allow loading of parts via overhead crane.

One or Two Heads? (See Fig #18)

When first exposed to the concept of twin heads on a large Sinker EDM, the reaction of many folks is, "Why bother? Why not just buy two machines?"

It turns out, however, that there are numerous applications for which twin heads offer substantial productivity improvements and lead time reductions.

For example, take a large automotive mold component (for a bumper fascia or dashboard for example) that has multiple features that must be EDM'd. With a twin head machine, two features can be completed simultaneously by the two heads, each of which has its own independent CNC, power supply, and motion system. Another application might be a turbine engine component that has seal slots on each end of the part. These slots could be EDM'd simultaneously, vastly improving the throughput in a cell type production system.

Fig #18 ONA twin head Modular Sinker EDM

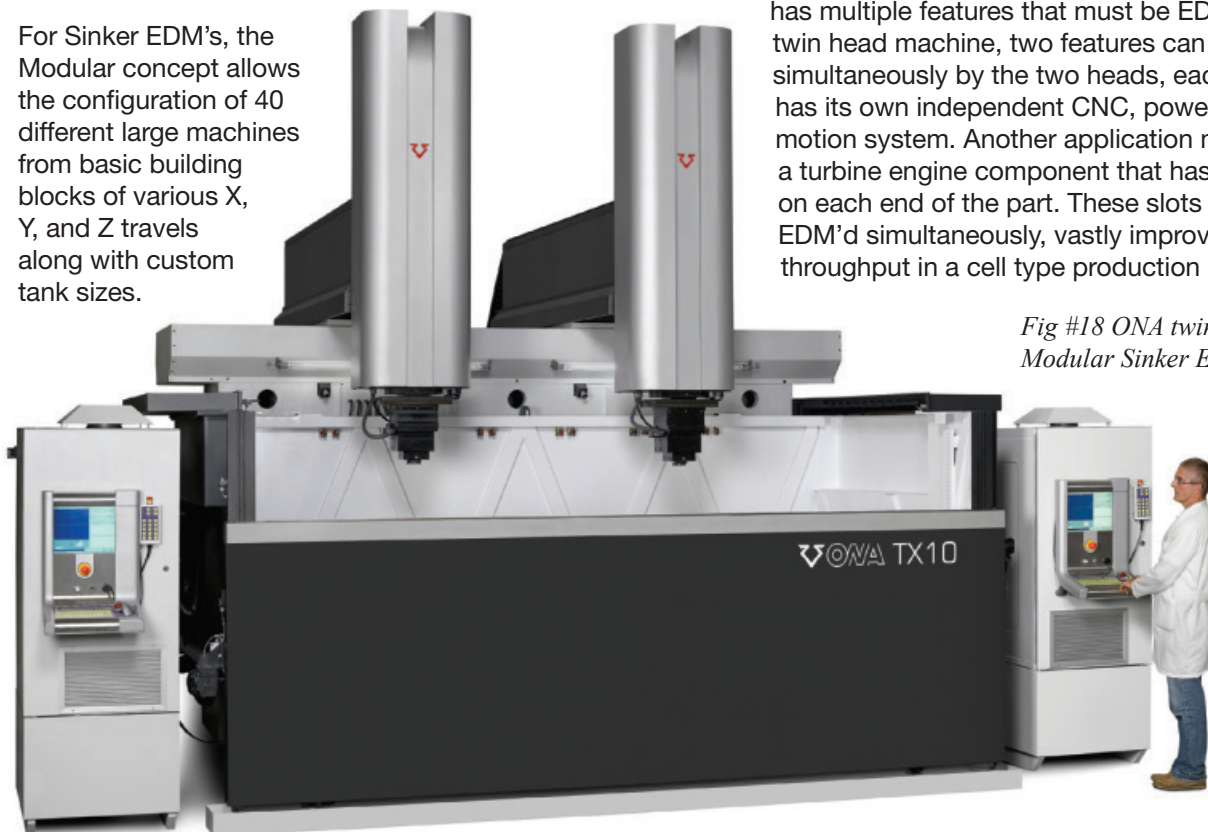




Fig #19 ONA designed and built extreme duty Sinker EDM C axis

Extreme Duty C-Axis (See Fig #19)

The world of large Sinker EDM's places unique demands upon the C-Axis utilized in these machines. Large, heavy electrodes, combined with substantial offsets from the C-Axis centerline, create very large moment arms that often result in a lack of kinematic precision and accuracy. In order to address this situation, ONA has developed and manufactured the world's most robust C-Axis for its large Sinker EDM's.



Fig #20 ONA Aqua Prima cartridgeless filter for Wire EDM

Ecological Filtration (See Fig #20)

ONA is the world's leader in ecological EDM'ing, as they offer optional dielectric systems that are both 100% environmentally friendly and offer substantial long term operating cost savings. By eliminating the cost of down time, maintenance labor, filter cartridges, and dielectric drag out filter change losses (for Sinkers), these systems offer customers savings that amount to tens of thousands of dollars over the life of the machine as well as simple compliance with government and corporate green initiatives. (See EDM Today, Spring, 2011 Cover Story "Cartridgeless Filtration")

"The Proof is in the Pudding"

OK, all that being said, what can these machines do? Fig #21 and Fig #22 are representative of the demanding Wire and Sinker applications regularly accomplished on ONA machines.

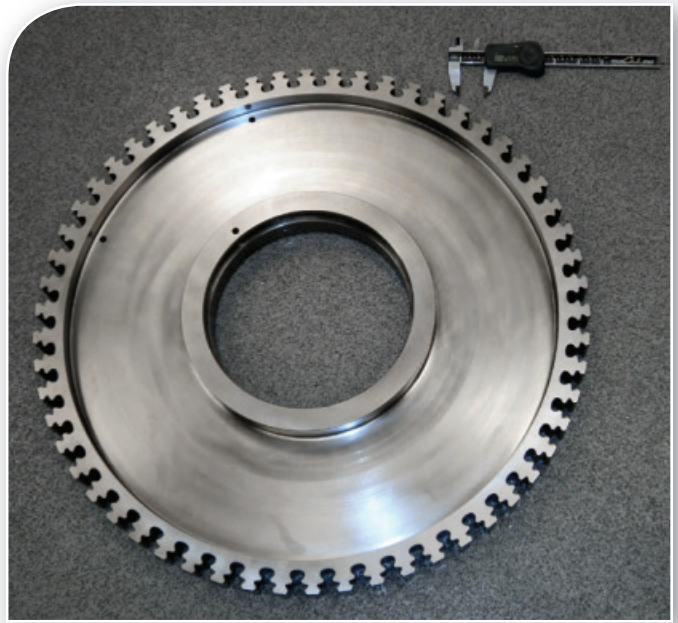


Fig #21 Gas turbine rotor with fir tree slots Wire EDM'd

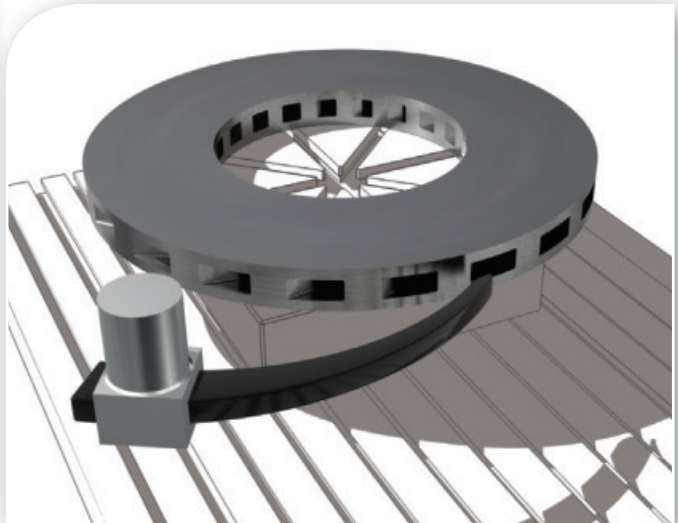


Fig #22 One piece impeller with complex Sinker burned passages

The Next Generation

ONA has just introduced its latest premium, high precision Wire EDM: the ONA AV25. This advance generation machine (shown on the cover of this Summer issue) offers a number of groundbreaking capabilities:

- Custom designed CNC
 - Accommodates up to 8 axes controlled simultaneously.
 - Unique Linux operating system with open architecture design to seamlessly integrate with other applications.
- New generator design configurable by software that will readily accommodate future technological developments, reducing the potential for technical obsolescence.
- Extreme collision protection that detects collision forces of less than 2 pounds.
- Reliable threading of wires from .003" to .013".
- Advanced energy controls.
- Reduced wire consumption.
- Compact design that minimizes floor space.
- Automatic work tank drop door.

ONA EDM USA

ONA EDM USA is a fully owned subsidiary of ONA Electroerosión and is located in the heart of EDM country in Macomb, Michigan. ONA EDM USA offers a modern showroom and demo facility, parts department with extensive inventory, complete service facility, and a fully staffed applications department. ONA EDM USA has strategically placed service engineers serving all geographic areas of the USA.



My ONA hosts: Jose MaRamos (Left), Mark Emerson (Center), Pedro Echenagusia (Right)

I'd like to thank Mark Emerson, President of ONA EDM USA; Pedro Echenagusia, Marketing Department of ONA; and Jose MaRamos, Technology and Innovation Manager of ONA for their outstanding hospitality and openness in hosting my visit to the ONA Durango facility.

– Roger