CASTRO COMPOSITES

TRAINING COURSE

GENERAL COMPOSITE MATERIALS

Intensive theoretical-practical program

Index

What is a composite?

A composite is a material composed of a matrix (resin) and a reinforcement fibre (glass, carbon, aramid, etc.), which combined acquire high mechanical, chemical and aesthetic properties.

These are very strong and lightweight materials that are extremely useful for manufacturing a multitude of parts in many industrial sectors.

In which sectors are carbon composites present?

Composites are present in many of the objects that surround us and very significantly in the industry at almost all levels. It is difficult to find any sector in which composites are not involved in some way or another.

Below are the main sectors where we find the Composites:

- **Marine**: manufacturing of all kinds of high-end recreational boats, competition and military.
- **Aeronautics/Aerospace:** manufacturing of numerous parts for commercial and military aircraft, UAVs, and USVs (wings, flaps, fuselages, cabins, interiors, etc.).
- **Renewable energies**: manufacturing of blades, spars, etc. for wind or underwater turbines.
- **Automotive:** manufacturing of bodies and chassis, interiors, roofs, doors, etc. in competition and military vehicles (cars, off-road vehicles, motorcycles, etc.).
- **Construction**: manufacturing of pipes, beams, roofing elements, bridges, etc.
- **Sports**: manufacturing of canoes or kayaks, skateboards and skis, etc.
- **Urban and domestic furniture.**
- **Others**

Who is our course aimed at?

- **Employees of any company related to Composites**. The courses are designed to be taken by personnel with low technical qualifications up to even production or technical area managers who want to reinforce or expand their theoretical and practical knowledge.
- **Individuals or independent professionals with a desire to start a new business or career who want to access this sector with an in-depth knowledge of the materials and the processes related to Composites.**
- **Technicians from research and R&D centres**, who wish to train in the production techniques used in Composites, as well as study the properties of new materials and manufacturing processes.
- **University and vocational training students** to whom a future-oriented education is to be provided.
- **Postgraduate students**: architects, technical architects, industrial engineers, aeronautical engineers, naval engineers, chemists, etc.
- **Unemployed individuals from sectors involved in Composites**,- or from other sectors–who wish to gain a professional qualification oriented towards new technologies.

More than 1200 trained students endorse us!

What is the course syllabus?

Theoretical content

The main mechanical, physical and chemical properties of the most important thermosetting resins on the market are studied, focusing primarily on **POLYESTER**, **VINYL ESTER** and **EPOXY resins**. New generation resins such as those derived from **URETHANE-ACRYLATE** chemistry are also mentioned. The variants of these resins are studied – low styrene emission resins (DCPD), vinyl ester-DCPD resins, and so forth.

Special attention is paid to gelcoat applications and the different types and their application methods are studied, emphasising possible failures and how to avoid them. We study gelcoats for parts and moulds, differentiating between polyester, vinyl ester and epoxy gelcoats. The new **GelTint polyester gelcoats from Scott Bader** will be presented.

The main applications of thermosetting resins are analysed: cross-linking monomers, catalysts, accelerators, hardeners and inhibitors.
The importance of the resin polymerisation cycle is analysed in detail: gel time, exothermic peak, hardening and curing.
The importance of the mechanical properties of these materials is highlighted, specifically the relevance of Hooke's Law and Young's modulus.
We focus on the importance of the glass transition temperature (Tg) or heat distortion temperature (HDT) of resins.
Additives for thermosetting resins: thixotropy, pigmentation, fillers, diluents and flexibilisers.
Reinforcing fibres: glass, carbon, aramid (better known by one of its trade names, Kevlar® or Twaron®), as well as combinations thereof. We will learn about spread tow carbon fibres. The mechanical, physical and chemical properties and their associated composites are studied.

Materials for manufacturing sandwich structures **(PVC cores, balsa wood, Sphere.tex and Sphere.cores, SAN, PMI, PET, Core Cork®, Millifoam®, honeycomb, and so forth)**. Compression and shear resistance of this type of sandwich laminate, which is characterised by its lightness and rigidity. These are the most commonly used structures in the construction of boats, aeroplanes, wind turbine blades, etc.

Mould release agents. We study the latest / cutting edge / high tech semi-permanent mould release agents, which we will use during the practical sessions, and we will indicate their advantages over older mould release agents, such as waxes or polyvinyl alcohols.

Manufacture of composite moulds with low-shrinkage polyester and vinyl ester resins. Construction materials and processes (low-profile or very low-shrinkage resins and exothermic peak).

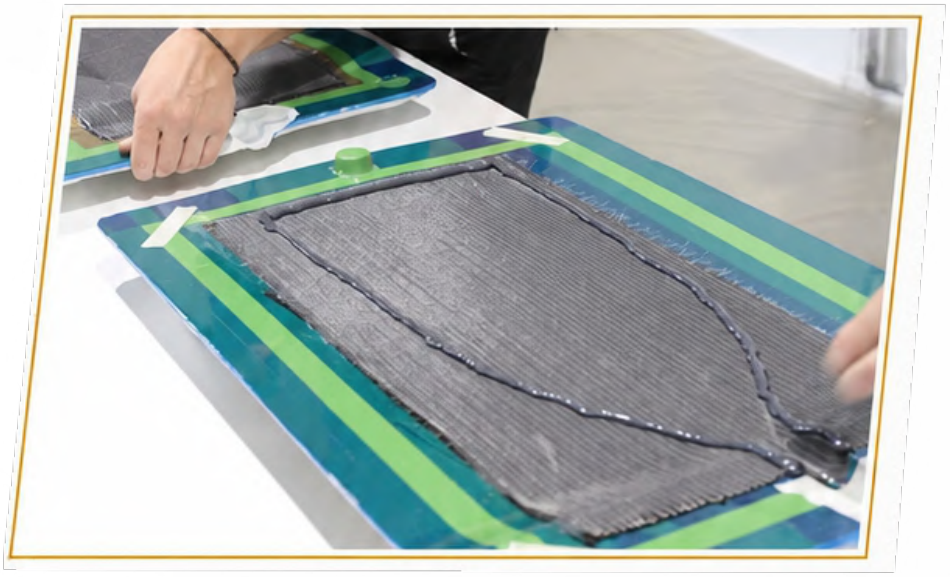
Manufacture of moulds with epoxy resins. High Tg epoxy resins. Virtually zero-shrinkage resins. Vinyl ester gelcoats compatible with epoxy laminates.

Structural adhesives. Properties and uses. Epoxy, urethane acrylate and methacrylate adhesives for structural bonding of composite-composite, metal-composite, metal-metal, wood-composite, etc.

We will pay special attention to adhesives from the **Crestabond®** range, manufactured by Scott Bader, which can even be used to bond galvanised and zinc-coated metals, as well as a wide range of plastics.

Manufacturing processes: summary of all composite manufacturing processes (hand lay-up, spray-up lamination, centrifugation, filament winding, RTM, VARTM, SCRIMP, pultrusion, vacuum infusion, SMC, BMC, GMT, etc.).

Practical Content



Crestabond M1-20 (methyl methacrylate adhesive) application on carbon-epoxy laminate.

Special emphasis will be placed on composite manufacturing processes using the **RTM** technique (lightweight and classic) and the **vacuum infusion** process. We will devote one day of the five-day course to these processes. Description of the processes. Moulds and components used, machinery, resins, fabrics, consumables, type of resin flow, injection and vacuum pressures, etc.

We will be visited by staff from **Magnum Venus Products (MVP)**, a world leader in injection equipment (RTM).

Typical Manufacturing process and Production costs.

Practical Content

1. Introduction to Chemtrend® semipermanent release agents: water-based and polymeric sealers and release agents (Chemlease Flex Z® and PMR®) as weel as the Mikon® range. Comparison with waxes and polyvinyl alcohol. Advantages and disadvantages.

2. Manufacturing composite parts by hand lay-up using ortho and isophthalic polyester resins, as well as fire-resistant (Crestafire®) resins, reinforced with glass fibers.

Practical Content

3 Manufacture of an aesthetic carbon part using transparent epoxy resin and carbon fabrics. These resins are widely used in decorative applications

in sectors such as tuning, motorcycles, furniture, instrument enclosures, etc. We use the vacuum bagging technique.

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4 Mould production using chopped-strand glass mat and low-profile or near-zero shrinkage polyester resins. We will use a urethane-vinylester gelcoat and a vinylester-DCPD resin for the first reinforcing layer (**Scott Bader Rapid Tooling system**).

5 Construction of a small epoxy mold. We will use epoxy resin and the epoxy-compatible vinylester gelcoat **Resoltech VI5090** with high Tg, and a high-thermal-resistance epoxy resin.

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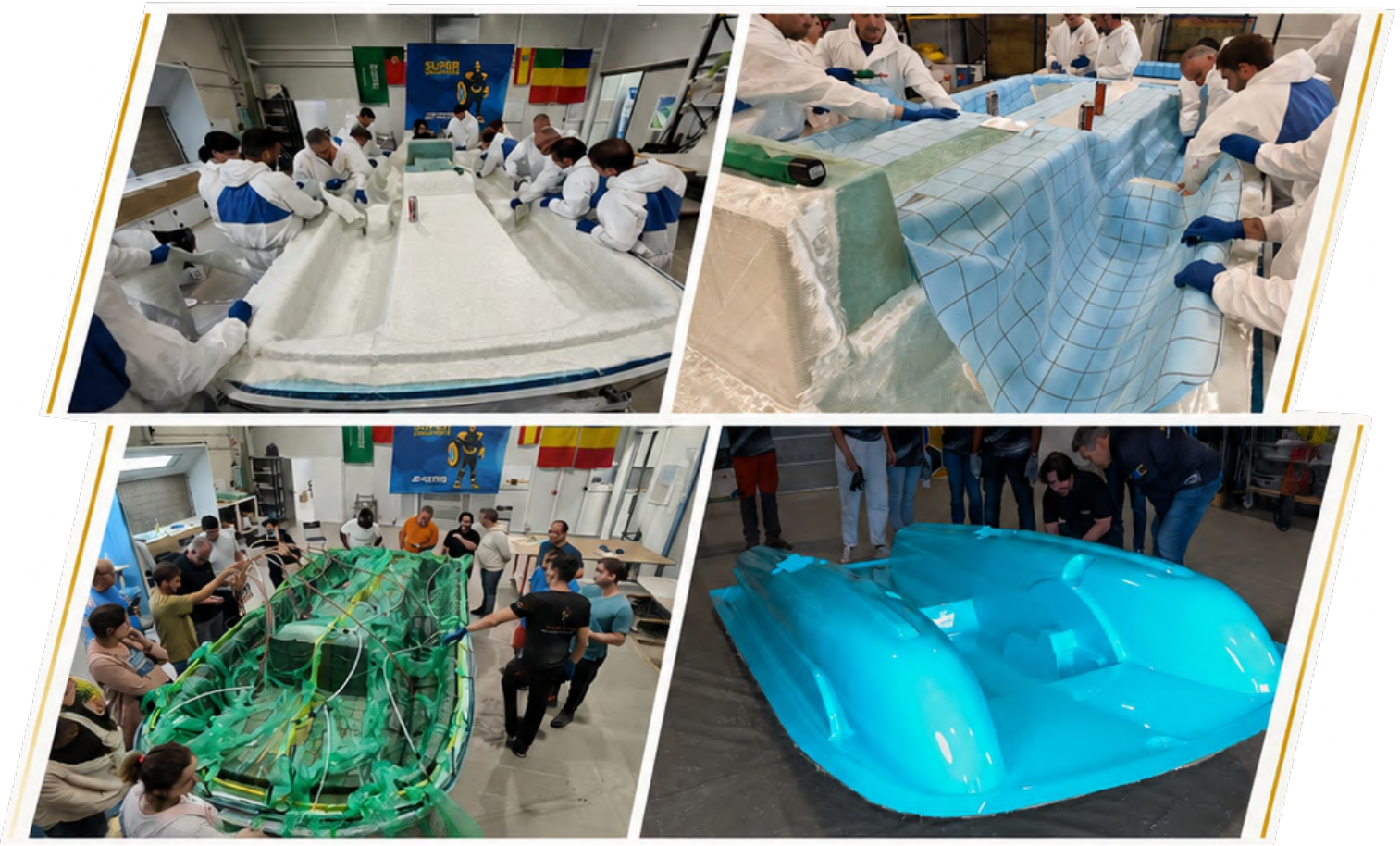
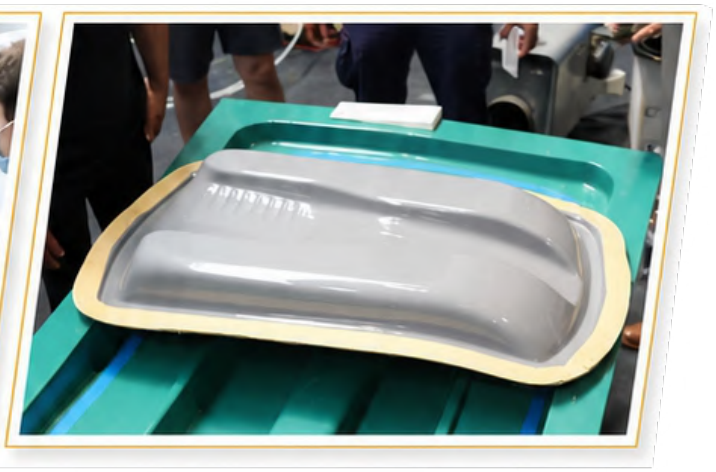
Practical Content

6 Manufacturing of the hull of a recreational boat by resin infusion. The hull of a 14.95 m² recreational boat will be manufactured using a resin infusion process. In order to complete the practice during the course, the application of the isophthalic polyester gelcoat GelTint GT-900 on the mould, as well as the protective skincoat laminate with 150 g/m² glass mat and vinyl ester-DCPD resin, will be carried out the week before the course, leaving the surface prepared for the work with the students. During the course, the main laminate will be produced using low-viscosity polyester resin, different glass fibre reinforcements and PVC cores in two thicknesses. The students will take part in the preparation of the laminate, placement of reinforcements, resin injection pipes and channels, as well as the remaining vacuum consumable materials required to carry out the final infusion of the part.



Practical Content

7. Manufacture of a composite sled injected by Light RTM (Resin Transfer Moulding), using the high-fire-resistance **Crestapol 1211A** resin.



Where are our training courses held?

Castro Composites has excellent facilities, covering more than 1200 m^2, in the Industrial Estate of Areas, located in Tui (Pontevedra, Spain), where we have suitable facilities, with fully equipped classrooms and worshops for theoretical and practical presentations. We also offer our training courses at our clients' facilities, but in this case, special and tailored offers are made to meet their needs.

Who has benefited from our training courses in recent years?

1. **Client companies of Castro Composites** involved in any of the sectors described above, such as:: Sociedad Andaluza de Componentes Especiales (S. A. C. E. S. A.), EUROCOPTER ESPAÑA (Rota, Cádiz), GURIT (One of the world leaders in the manufacturing of epoxy resins, pre-impregnated materials, etc), Nordex Blades S. A. U (a world leader in the production of wind turbine blades), HG Windtec Costa Rica and Coverwind (Wind turbine blade repair companies), TPI Composites (Wind turbine blade repair and producer), BTREN Bombardier, Stadler Rail Valencia S.A.U. and Talgo (Train Manufactures), TRETY (Automotive); RODMAN POLYSHIPS, Prosailing and Astilleros Cata (marine), Dronetools (UAVs and helycopters), ELA Aviación (autogyros), FIBERGLAS (Tank and depot manufacturer), AMORIM (Core Cork manufacturer), INGEMAT and TALIO Ingeniería (Composite Materials Engineering), Zyvax (Release Agents manufacturer), Grupo Navec (Refineries and facilities at nuclear power plants), Constructora Eshor (Building & Construction), ALSA AUTOBUSES and Modasa Perú (Bus manufacturers), Mascyf (Fire protection equipment), Aseguradora Mapfre (insurance company), Palfinger Marine, Intermas Nets (vacuum materials manufacturer), Stahl S.A.C. Peru (Manufacturing of boilers, storage tanks, and containers) , Transportes Navarro Puente, S. A Perú (Transportation of hazardous waste), MOLDEAR PILETAS Y PREMOLDEADOS, S.A. Argentina (Manufacturer of swimming pools), Marinas dedicated to the repair of fiberglass reinforced plastic (FRP) boats, and many more …

2. **Public organisations** such as the University of Vigo (School of Industrial Engineering and the School of Technical Engineering), University of Navarra, the Polytechnic University of Madrid, Polytechnic University of Catalonia, University Rey Juan Carlos (Madrid), University Jaime I (Castellón), University of la Frontera (Chile), National Center for Development in Telecommunications Research (CENDIT) (Caracas, Venezuela), University of Puerto Rico, Vocational Training Xunta de Galicia, etc.

3. **Technological centres** : Automotive Technology Center of Galicia (CTAG), AIMEN Technology Center, AITEX, CTM Technology Center Foundation (Manresa), Gaiker Foundation (Vizcaya), Galician University Business Foundation, Cidaut Foundation (Valladolid), Ascamm Foundation (Barcelona), CEDER-CIEMAT (Center for Energy, Environmental and Technological Research) of the Ministry of Economy of Spain, Prodintec Foundation (Asturias), Technological Center CETIM (Barcelona), etc.

4. **Individuals or self-employed persons** who wanted to start a business project and were unaware of these applications, or simply aimed to improve their skills and discover new materials and processes related to composites.

5. **Unemployed individuals or those seeking their first job**: We have trained dozens of people and helped them secure employment in the composite materials sector or develop their own business projects.

6. We have trained students from all over Spain and abroad, including Portugal, Italy, Germany, the USA, Australia, Mexico, Costa Rica, Panama, Venezuela, Colombia, Ecuador, Peru, the Netherlands, Paraguay, Puerto Rico, Argentina, Chile, Uruguay, Brazil, Lithuania, England, Western Sahara, and Angola, among others..

What is the duration and schedule of the course?

5 intensive days, from Monday to Friday.

Schedule:

- Morning: from 9:00 to 14:00
- Afternoon: from 15:00 to 18:00

What is the price of the course?

1595 €/ trainee (plus VAT taxes)

The price includes coffee/ mid-morning snack, as well as lunch during the 5 days.

Special discount for groups! Check our offers.

WHEN IS THIS COURSE HELD?

From September 28 to October 2, 2026

From 9:00 to 14:00 and from 15:00 to 18:00

1595 €/trainee + VAT taxes

REGISTRATION FORM

Reservation of a place is only guaranteed upon payment of 1595 € + VAT into the Caixabank S.A. IBAN account number: ES02 2100 5911 1302 0000 0430, SWIFT / BIC: CAIXESBBXXX and the submission of this form with your personal or company data by email to the address listed at the bottom.

First Name and Last Name: _____

Address: _____

_____

VAT (companies) or Personal ID (individuals): _____

Phone: _____

Email: _____

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The Composites course by Resinas Castro, led by Alejandro and his expert team, is outstanding in every aspect. It focuses on the key theoretical knowledge required to understand the use of composites. The course is intensive in hands-on practice using a wide variety of products and technologies. It is thorough in sharing experiences and details that must be taken into account in order to achieve high-quality parts. Energetic, motivating, and generous in the way Resinas Castro shares the extensive knowledge accumulated throughout its history and interaction with clients. Taking this Best-in-Class course is an investment that guarantees both success and satisfaction. Congratulations to Resinas Castro for offering such a complete and essential course for companies and individuals interested in composites.

EMILIO ESTEBAN

GURIT - Global operations manager

Never has a company slogan been more accurate: "We enhance your skills." And if you didn't know you had them, they help you discover them. From the very first phone call, I felt warmly welcomed by this company. It has been the best money I have ever invested in training: outstanding knowledge of products and methods, excellent documentation, and highly generous practical sessions in terms of both materials and dedication. But if I had to highlight one thing, it would be the support and guidance they continue to provide after the course, because some things simply cannot be measured in money. In times like these, that means a great deal. And something very important to me, from a gender perspective: treatment that goes far beyond excellence.

IRANZU ZORZABALBERE

Uznari Kayaks

Our Skydweller team had the opportunity to take part in a specialized carbon fiber course taught by Castro Composites.The course covered in detail the different types of resin combinations, their compatibility with carbon, glass, and aramid fibers, as well as manual lamination, infusion, and prepreg techniques.

The theoretical part was clear and well-structured, with in-depth explanations of the mechanical and chemical properties of each material.One of the most valuable aspects was the hands-on session, where we had the opportunity to work with different resin formulations under real application conditions.For the Skydweller team, this course was especially relevant, as we work with high-performance aerospace structures.

The knowledge gained will enable us to refine our manufacturing and maintenance techniques for critical components, ensuring greater efficiency and performance in our operations. Additionally, interacting with Castro Composites experts provided us with new perspectives and innovative solutions for applying composite materials in our projects.This experience was key to strengthening our knowledge and skills in the application of advanced technologies for the manufacturing and repair of composite structures in the aerospace industry.

The course at Castro Composites exceeded our expectations in terms of technical content, quality of teaching materials, and hands-on experience.We would like to thank Alejandro Castro and his instructors for their professionalism and for delivering top-level training that will have a direct impact on the quality of our work.

RAFAEL SIGNORELLI ***Skydweller***

The carbon fiber specialization course by Resinas Castro was decisive in helping us professionalize our trade within the company. After spending a long time learning on our own, running tests, and developing products, being able to discuss our questions directly with the experts at Castro Composites gave us the final push we needed to enter a truly professional environment where quality standards are extremely high.

URKO LARRAÑAGA
123sonar

A well-known saying goes: "Power without control is useless." In the same way, no matter how much enthusiasm and determination you may have, without proper learning your project will hardly succeed. In this regard, the Castro Composites Materials Course laid the foundation for channeling all that energy in the right direction. With solid, high-quality training, the path became much easier. After many months of self-teaching, I decided to take a composites materials course. Just one day into the course, I realized how much time, effort, and money I would have saved if I had done it earlier. If, like me, you want to make a living from composites, training is essential. I will always be grateful to the Castro Composites team.

DAVID SEGADE FREIRE
Karbonius Composites

In 2016, combining my passion for aeronautics, emerging technologies, and the expansion of the agricultural industry, I saw a business opportunity in the development of an unmanned aircraft for aerial application.

Seeing that the aeronautics industry in general was increasingly shifting towards construction with composite materials, I decided at the beginning of 2017 to look for a course that would allow me to delve into the knowledge, handling, and characteristics of this technology.

After conducting an internet search and defining the alternatives based on location, date, language, and content of the available courses, I wrote to a couple of companies. After receiving the kind response from Chola Araujo, and given that they had a specific course on Carbon Fibre and Pre-impregnated, I decided on Castro Composites.

The truth is that I can only say good things about the course, and it positively surprised me in many aspects:

***The organisation**, solving the problem of accommodation and meals at reasonable costs according to the circumstances. **The transfer from the hotel to the Castro Composites facilities**, handled by Pedro, who not only picked us up every morning but also shared all his experience and expertise in handling composite materials with his excellent humour and willingness.*

***The theoretical lectures** in the hands of the owner himself, Alejandro Castro, extremely passionate, with knowledge not only vast but also permanently updated.*

***The printed notes** that were given to us, a very complete and didactic summary of much of what we saw, still serve me today as a help for any doubt that arises when putting the knowledge into practice.*

***The lunches and snacks** of high quality, abundance, and variety (far above what was expected).*

***The variety of practices**, which allowed us to see that all those incredible products you see in photos, and that seem like they are from NASA or a leading global factory, are within our reach with the appropriate knowledge and materials.*

***The abundance of materials and equipment** that were provided to us so that each of us could carry out various practices, often even based on our own desires to learn and experiment.*

I was surprised by the commitment of Alejandro Castro and his friendly team to the group's learning. And I found it very interesting that in addition to the courses, the company is a supplier of inputs for this industry, which means that they are not only very up-to-date with advances and news regarding new materials, but they can also recommend specific solutions based on the available materials or even obtain materials based on the client's needs.

I must say with pleasure that after the course I kept in touch with Alejandro, I even made a significant purchase of materials from him for this project, and I have always been able to count on his advice for specific inquiries with the willingness to provide solutions in a completely selfless manner.

In summary, the course at Castro Composites exceeded my expectations, and made every Euro invested in it worthwhile, not only leaving us with valuable knowledge but also opening a door with a supplier/friend, who is up to date and can advise and provide us with everything traditional and new.

SANTIAGO LANDI
Grupo Euro

Unmanned aircraft for field spraying work carried out by Grupo Euro




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