

COMPOSITES  
TALKS BRAZIL  
SAO PAULO, 2024

**JEC**  
CONNECTING THE WORLD  
WITH COMPOSITES



# Boas Vindas Welcome



**Mr Eric Pierrejean**  
President, JEC

# JEC COMPOSITES

TALKS Regional gatherings of  
composites professionals

## Our Partner



# ALMACO

ASSOCIAÇÃO LATINO-AMERICANA DE MATERIAIS COMPÓSITOS

JEC

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# **JEC: a non-profit organisation dedicated to Composites:**

## **Our mission:**

**We are:**

- fully and entirely dedicated to the composite materials community;
- promoting all kinds of composite materials, technologies and applications;
- covering all markets and countries worldwide;
- fostering the applications of composites based on their benefits & properties.
- supporting diversity, inclusion and international dialogue;
- acting as a non-profit organization, reinvesting its earnings into its missions;

**“JEC: Connecting the World with Composites”**

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# JEC: serving the composites industry for 60+ years :

1963

Creation of a first information bulletin, which is nowadays the **JEC Composites Magazine**, the world's leading magazine dedicated to composite materials, their technologies and applications.

1965

A first conference on composites was created, which over time became **JEC World**, the world's leading international composites show.

1998

Creation of the **JEC Innovation Awards**, the most sought-after recognitions in the composites industry worldwide

2017

First edition of the **JEC Startup Booster**, the leading startup competition in the world of Composites and Advanced Materials

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# JEC Events: the place to meet & make business:

## JEC World

The leading event of  
the composites  
industry

Exhibition  
Business meetings  
Conferences  
Planets  
Startup booster  
Awards  
Networking  
Villages  
Live demo

## JEC Forums

Business meetings  
& conferences

JEC FORUM  
DACH

JEC FORUM  
South-East Asia

JEC FORUM  
Italy

JEC FORUM  
Central Europe

## JEC Talks

Conferences

### JEC COMPOSITES TALKS

Brazil  
Middle East  
Taiwan  
Nordics  
Japan ....

# JEC Media: a wide offer of print & digital content:

## The Magazine:



## Market reports



## Weekly E-letters



## Web TV



## Daily News feed



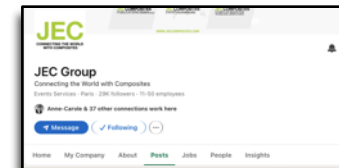
## Webinars & podcasts



## Special issues



## Social media



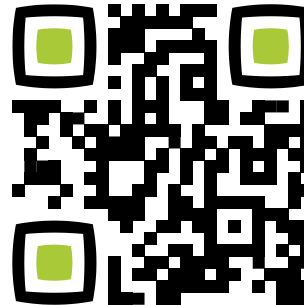
JEC

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- JEC Observer and special issues,
- JEC Market News daily updated,
- on your smartphone or tablet,
- with reading mode and videos.



Link to download:



# Apply to the JEC Innovation programs!



# Tell us your stories!

South America **BUSINESS**

## Trends in composites applications in Brazil



GUILHERME LIMA,  
EXECUTIVE PARTNER  
G12 INNOVATION

Several markets have fuelled the development of composites technologies and materials markets in South America, such as construction, transportation, agri-business, leisure, oil & gas, corrosion and sanitation, aerospace, marine, wind and electric energy. Large end-users such as Embraer, Mercedes Benz, Volvo, Volkswagen, Alstom, Marcopolo, Busscar, John Deere, Petrobras, GE and Gamesa were responsible for pioneering projects that would take composites to another level in Brazil and South America. The following projects exemplify some current trends.

Created in 1982, the Cesar Group in Goiás, Brazil, delivers innovative construction and logistics solutions. In 2006, it created Cesar Sistemas Construtivos, a company specialising in off-site construction with its hybrid modular construction system, a metallic structure with walls and ceilings in composites. The company's manufacturing park is headquartered in the Vice President José de Alencar Industrial Complex, in Aparecida de Goiânia, in an area of 80,000 m<sup>2</sup>, and it has branches in Brasília, Rio Verde, and Uberlândia.

Off-site modular construction is ideal for temporary or permanent structures. The company has a broad portfolio of products serving areas such as healthcare, education, events, housing, and business. The competitive advantages of using composites in these buildings are thermal and acoustic comfort, durability, ease of cleaning, very low maintenance, and speed of implementation.

The composite panels are currently manufactured by manual lamination. However, as of 2023, it will be a continuous lamination process. The core (thermoacoustic insulation) used is Flopir, a vegetable oil-based product.

The supporting structures are metallic, but in the near future, the intention is to make them out of pultruded composites. Modules can also be constructed off-site. They are prefabricated in the factory and taken to the installation site, where the final assembly takes place. Current production is between 10 and 12 modules per day, representing 180 tons of composites per year. The company's vision for 2023 is to double this volume to 24-26 modules per day. During the pandemic period, the modular building system was widely used. A highlight was the modular hospital project supplied to the Piracicaba City Hall (SP-Brazil), which was delivered in just 58 days.

The 620 m<sup>2</sup> structure had 44 beds for Covid patients, with respiratory support, generator, and other items for full operation.

According to a survey published by MarketsandMarkets Research Private Ltd (1), an annual growth rate of 5.75% is forecast for the global modular construction market between 2020 and 2025. This study points to Brazil, China and

Japan as places with the greatest opportunities for modular construction to develop.

Modular construction market report by type (permanent, relocatable), material (steel, concrete, wood), modules, end-use (residential, retail & commercial, education, healthcare, office, hospitality), and region - Global Forecast to 2025, MarketsandMarkets Research Private Ltd.

Composite coverings with a vegetable oil-based core

Rôga Empreendimentos, founded in 2006 in Joinville, in the south of Brazil, has the objective of expanding access to housing. The company's strategy is based on innovation with a focus on advancing industrialisation processes and increased productivity. With this focus on industrialisation, Rôga intends to expand its manufacturing space, in order to be self-sufficient in the production of its structural elements and thus ensure quality and standardisation, reducing costs and waste. In 2018, the company started working with G12 Innovation, a company specialised in composites, to



This modular construction system can be used for hospitals, laboratories, health centres, classrooms and to many other settings.

HOME • ANNOUNCEMENT

## Eve Air Mobility and Embraer announce first eVTOL production location in Brazil

HOME • ANNOUNCEMENT

## Zünd establishes a new subsidiary in Brazil

Zünd Systemtechnik AG is moving even closer to its Brazilian customers. As of the beginning of 2024, Zünd acquired its long-standing sales partner BG Soluções Tecnológicas, which is based in Porto Alegre.

READING TIME

## Planefibra embraces a movement that aims to reposition FRP tiles in Brazil

Fibreglass reinforced plastic (FRP) tiles are trendy in Brazil, mainly because of their translucency, which allows natural light to be used. However, this popularity has not prevented them from suffering

## Gatron signs contract with Alstom

Brazilian company Gatron, a manufacturer of composite parts, signed another contract to supply seats for 22 Alstom-manufactured trains. The trains will be part of Line 6-Orange of the São Paulo subway.



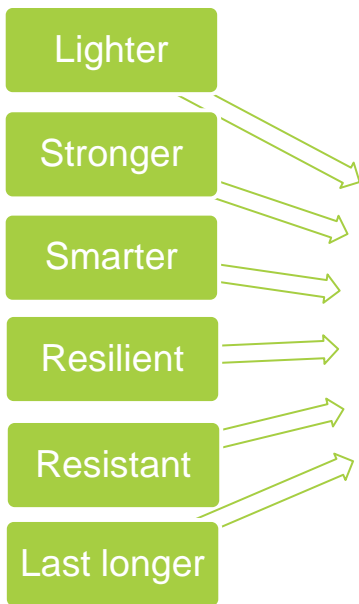
**INDUSTRY TRENDS**

# #1 trend: Sustainability



# Composites, key enablers of sustainability:

Composites are the materials of choice to decarbonate the economy and develop more durable solutions. Their properties have gained more and more interest for various sectors.



They open up unlimited possibilities for a more sustainable world

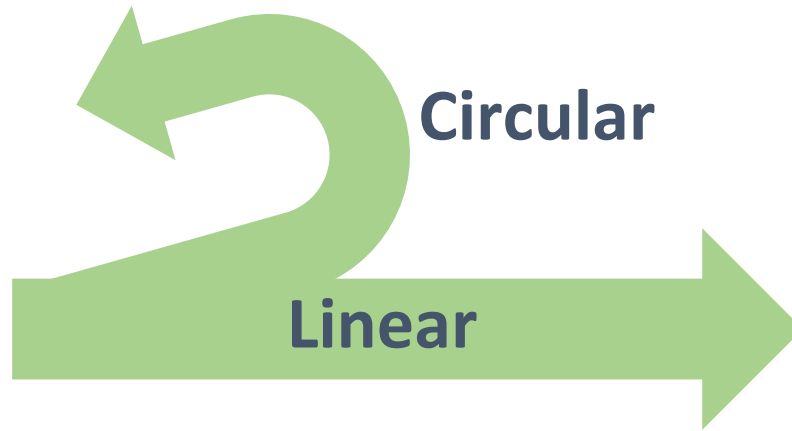


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# Sustainability, a challenge for composites industry itself:

## Numerous tasks on the path to a circular industry:

- **REDUCE:** energy, raw material and resources consumption, production scrap,...
- **RECYCLE:** via thermal, mechanical, chemical processes.
- **REPAIR:** parts replacement, repairing, healing, maintenance, testing.
- **REUSE:** reintroduction of parts and components in process.
- **REPURPOSE:** by using composites parts for a different use.



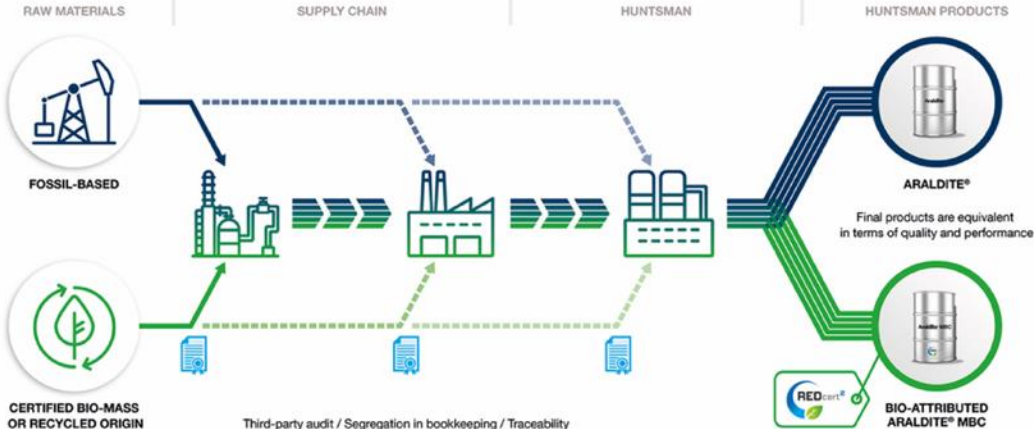
# New skills, expertise & indicators are requested / compulsory: CO2 footprint / Mass Balance Certification / Cradle to Gate / Grave LCA (Life Cycle Analysis)



Biomass Balance

**Huntsman to showcase sustainability through advanced chemistry at JEC World 2024**

Huntsman returns to JEC World 2024 in March with a resolute commitment to advancing towards sustainability through cutting-edge chemistry. Visit booth K32 in hall 6 at JEC World in Paris from March 5th to 7th where the team will reveal groundbreaking innovations that showcase Huntsman's commitment to driving towards sustainable transformation in the global composites industry.



# Emerging market of secondary products & intermediates:

Various recycling technologies and production scrap repurposing are offering a wider offer of products especially based on carbon fiber.



FAIRMAT



LINEAT AFFT Tape



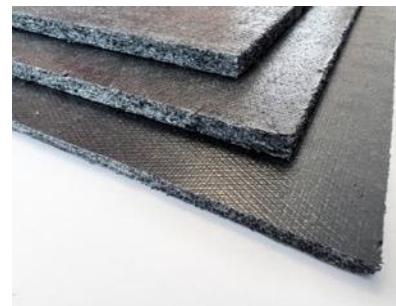
Extractive PHYre®



COMPOSITES RECYCLING



PRF Composite Materials REEPREG



RECARBON Organosheets

# Ongoing process of certification of products and production units:

**Swancor obtained “The first GRS Certified 100% Recycled Carbon Fiber”**

GRS certified recycled fiber from circular recycling materials, the first GRS certified 100% Swancor.

**Kordsa’s circular production model accredited with ISCC Plus Certification**



**HRC has obtained GRS 4.0 certification for carbon-neutral products**

Two recycled carbon fiber products independently certified to comprehensive GRS Standard 4.0 certification.

**Teijin to produce Tenax carbon fibre from ISCC PLUS certified sustainable raw materials**

Teijin Limited Carbon Fiber from biomass certification



**European Toray unit obtains ISCC certification for carbon fibre production plants**

Toray Industries, Inc. announced that its French subsidiary, Toray Carbon Fibers Europe S.A., has obtained ISCC PLUS<sup>®</sup> certification for its Lacq and Abidos production plants in South-West France .



# First demonstrators of recycled material in aerospace parts

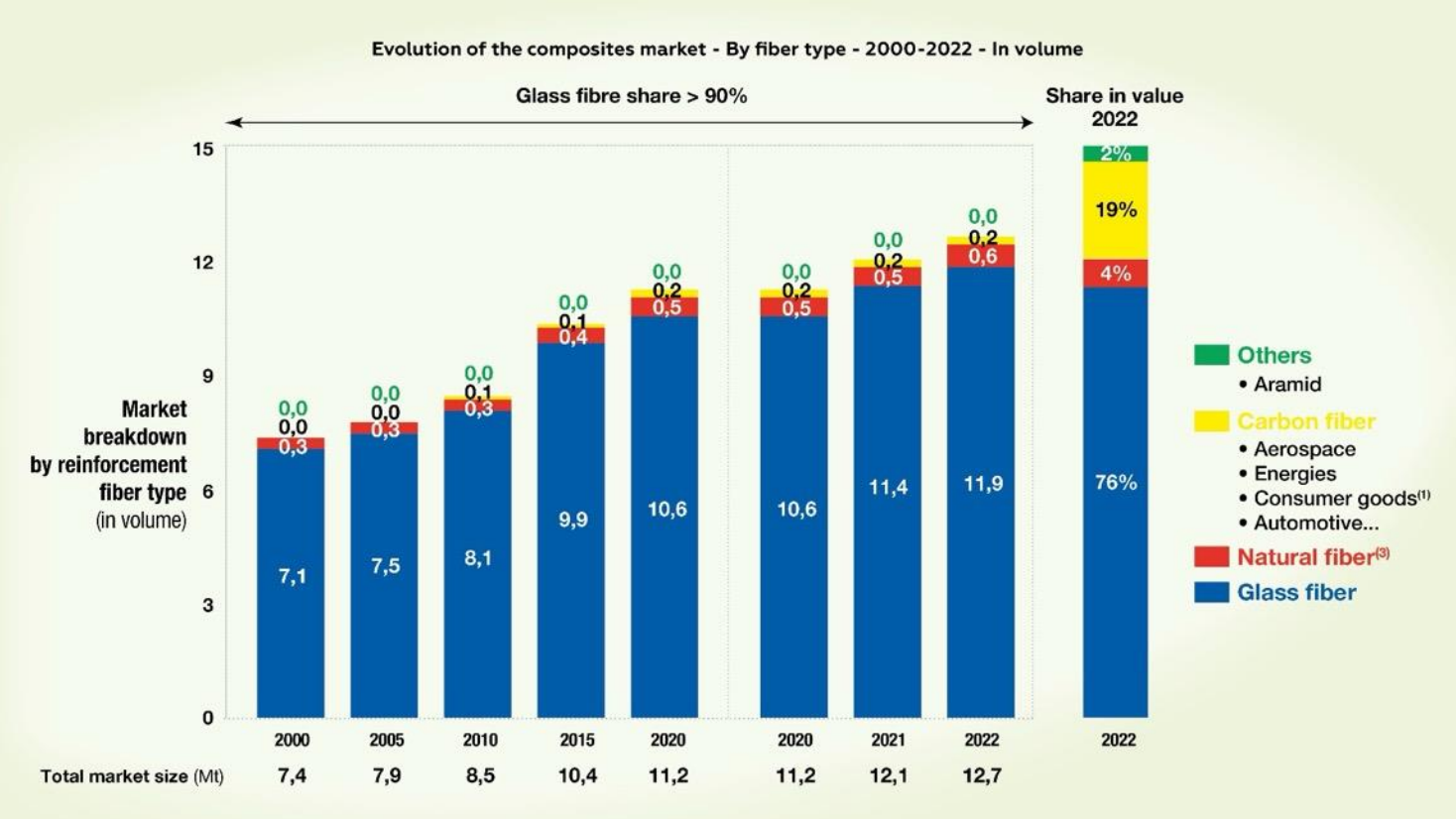
VESO Concept: Air Inlet Outer Surface (AIOS) part in recycled carbon fibres



CETIM : recycling of production waste material into access panel as part of TERRA PRETA Project (Thermosaic recycling process)

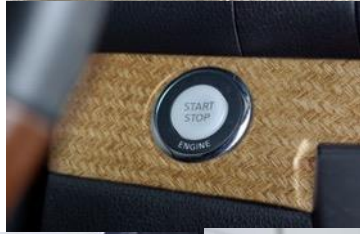


# Main types of reinforcement fibers:



# Increasing number of applications with natural fibers:

Current product offer is mainly based on Flax, but alternatives are developing with local sourcing (Jute, Kenaf, Ramie, etc)



## Hexcel launches HexPly® nature range

Hexcel has developed a new product range that combines Hexcel resin systems made with bio-derived resin content with natural fiber reinforcements to create material solutions for automotive, Winter Sports, Marine and Wind Energy applications.

## Porcher Industries is launching a new range of flax fiber-based thermoplastic composite materials for the automotive industry

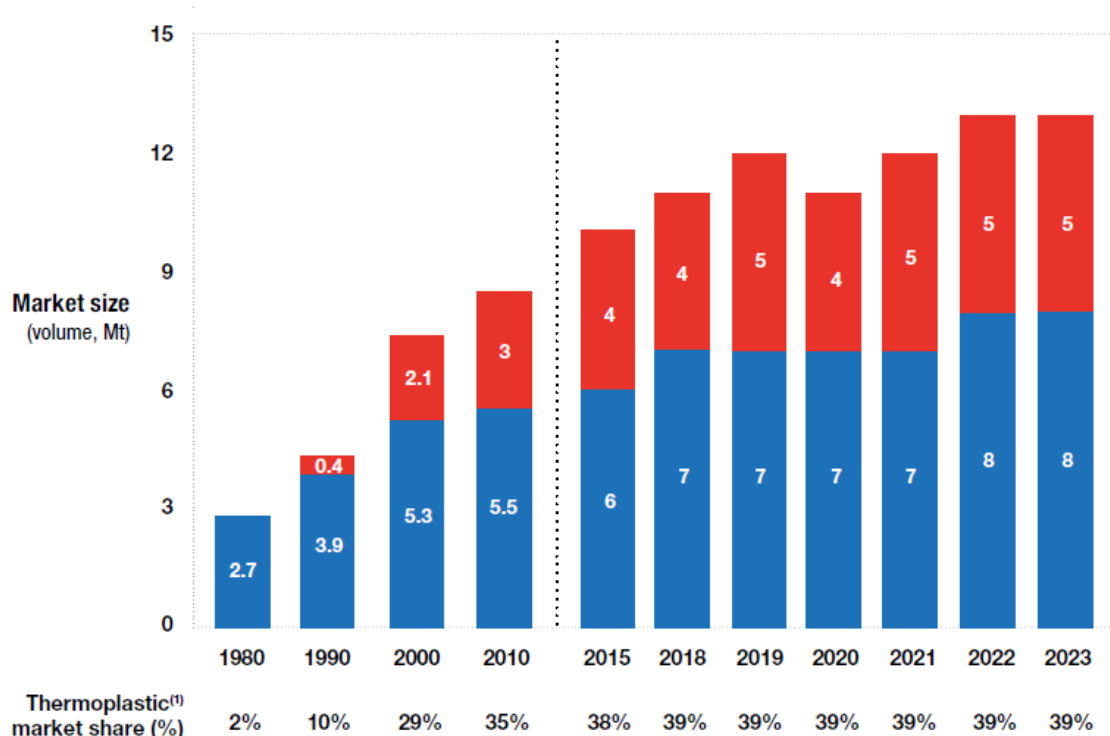
Porcher Industries is announcing the launch of a new range of automotive industry-grade thermoplastic composite stiffeners made primarily of flax fibers grown, selected, mixed, and woven in France. These products will be sold as textiles that can be thermo-compressed and injection molded.



*@Karl Mayer  
Bcomp  
KTM  
BMW M*

# Main types of resins matrices

Evolution of composites market - including thermoplastic market share - 1980-2023 - In volume



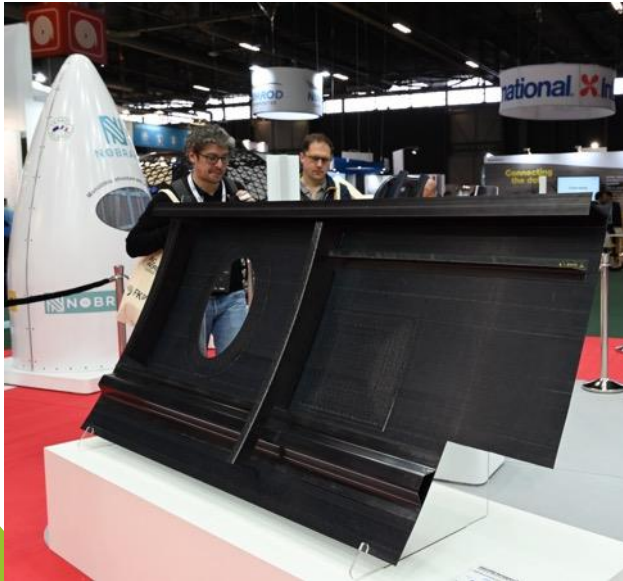
	CAGR 1980-2023	Cost index 2023 <sup>(1)</sup>
<div style="color: red;">■</div> Thermoplastic <ul style="list-style-type: none"> <li>• Main applications include automotive, aerospace...</li> <li>• High flexibility, high environmental tolerance, light weighting, lower cost</li> <li>• Main process of injection molding.</li> </ul>	11%	1.0
<div style="color: blue;">■</div> Thermoset	2%	1.1

**Delta**  
**1980-2023**  
**+37 pts**

# Transition to Thermoplastics:

Structural component demonstrator of the HAICoPAS project\* with welded UD PEKK/carbon.

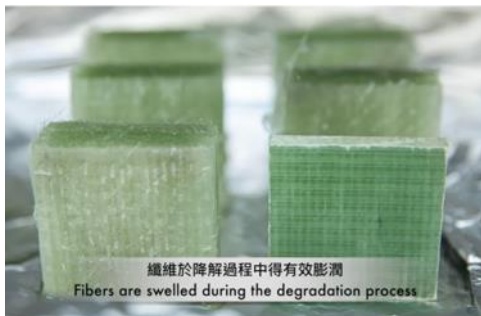
Hexcel and Arkema achieve a first thermoplastic aeronautical composite structure demonstrator at JEC World 2024



\*Hexcel, Arkema, Ingecal, Coriolis Composites, Pinete Emidecau Industries, Institut de Soudure and CNRS laboratories (PIMM, LTEN)

# Development in matrices & resins to match new challenges:

On top of the Thermoset/Thermoplastic transition, the introduction of new types of « hybrid » and bio-based resins is getting more interest as well as repairable or self-healing resins:



SWANCOR Recyclable Thermoset resins



ADITYA BIRLA Recyclable Thermoset



SICOMIN Bio-Based Epoxy resin



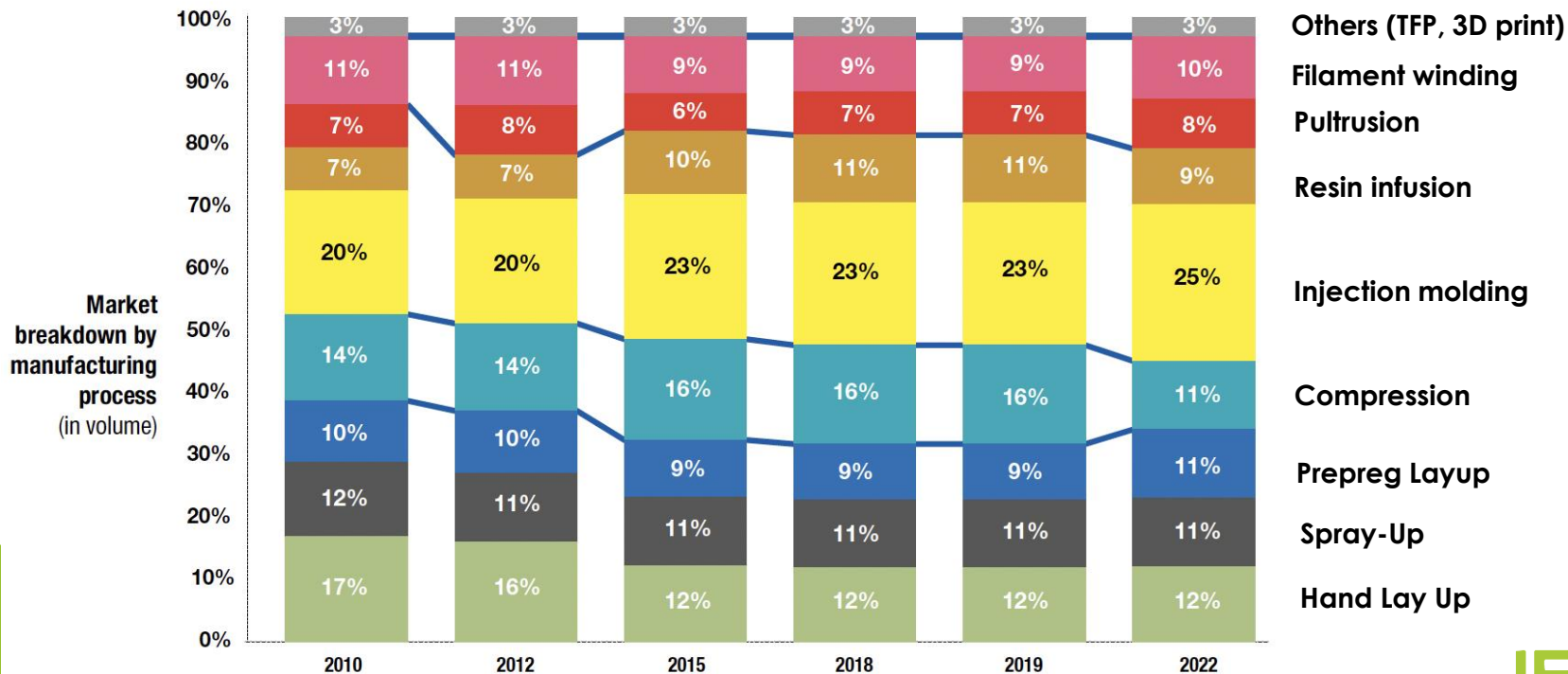
MALLINDA Vitrimers



ATSP Estherm Advanced Aromatic thermosetting copolyester

# Evolution of manufacturing processes:

Labour intensive, manual processes slowly declining, vs injection & continuous processes



# Large scale additive manufacturing



## Thermwood LSAM additive printer 510 live printing at JEC World 2024

Thermwood will be LIVE printing an autoclave capable tool for composite layup of an airplane engine air inlet duct on an LSAM Additive Printer 510 in the LIVE Demo Area located in Hall 6 at JEC World 2024 in Paris, France on March 5th-7th. They will print a new tool each day with material from a different material supplier (Sabic LNP™ THERMOCOMP™ AM EC004EXAR1, Airtech Dahltram I-350CF, and Techmer PM PESU-1810).



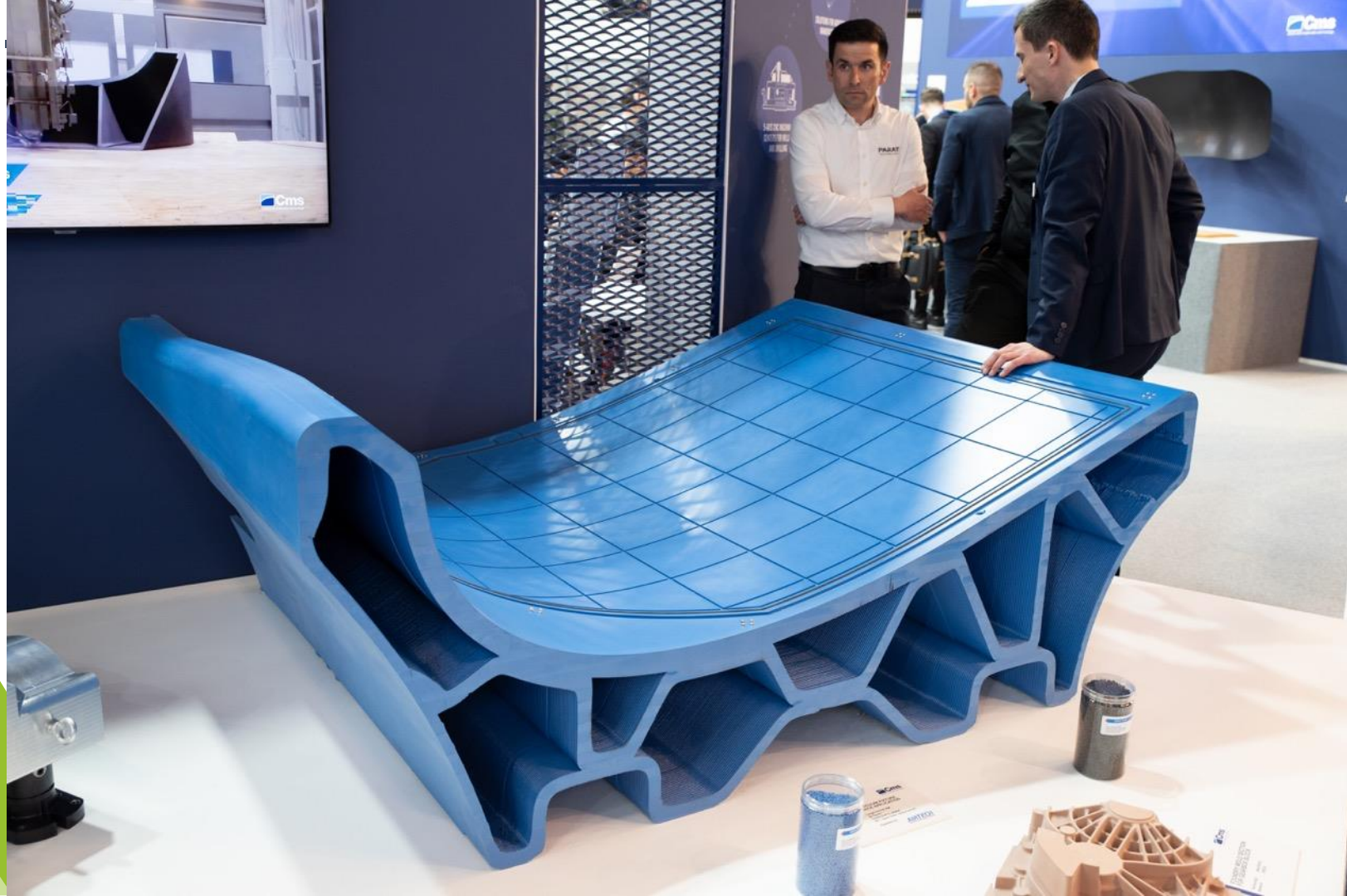
# COMPOSITES: TECHNOLOGIES FOR CIRCULAR PRODUCTION

3D Printing

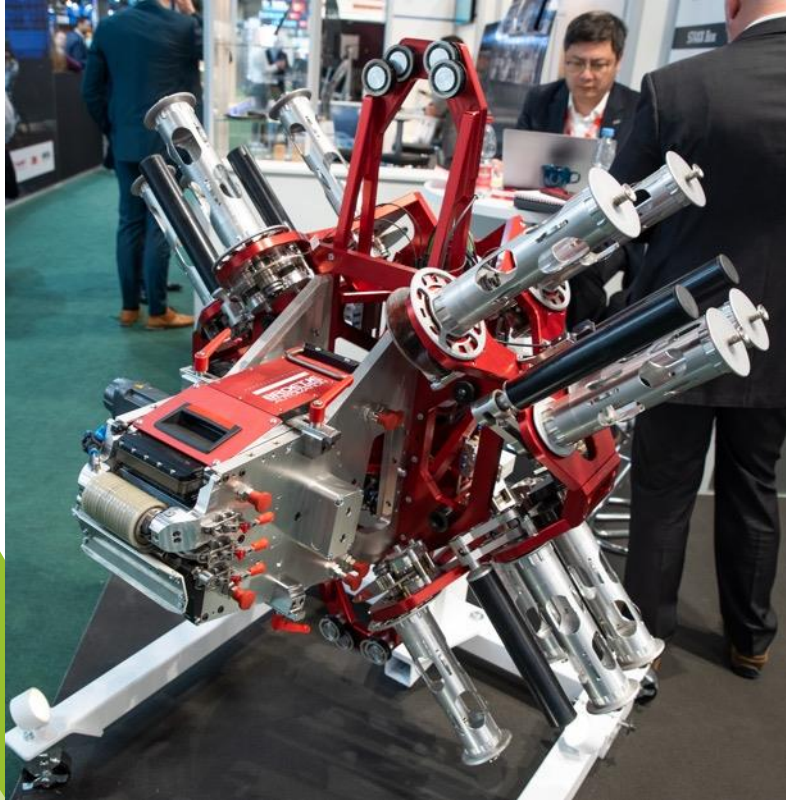
Fiber  
Placement

## NAVAL LFAM MOLD

- **DESCRIPTION:** One-Piece Boat Hull Mold 3D Printed by Ingersoll **MASTERPRINT®**
- **PRINT TIME:** 30 hours
- **MILLING TIME:**



# Automation in production with AFP, ATP and APP (Fiber, Tape and Patch Placement), 3D Weaving, Preforming



# The new era of material informatics: Industry 4.0, Automation, NDT, Data /AI, etc

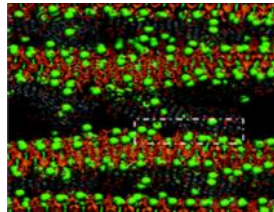
Fully digitalized End to End materials, from raw material definition to life-time monitoring

- Efficiency
- Risk Assessment & Control
- Health & Safety
- Time to product
- Event resolution time



## Substance definition

Quantum Chemistry  
Molecular design  
Data science  
Material Digital twin



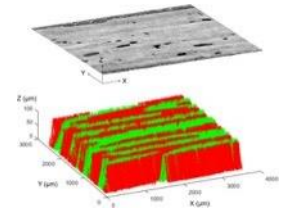
## Materials & Process development

Molecular Dynamics  
AI to forecast test data & fast track resin formulation



## Parts&Structure Optimization

Design,  
Multiphysics Modelling  
Data Analytics  
Finite element analysis



## Process Optimization & quality control

AI Image analysis to fast track process parameters optimization & Accelerate quality control



**PUSHING  
THE LIMITS**

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Composites Show

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# JEC

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