

EXPERTISE. As the world leader in aircraft wiring, Labinal covers all facets of this complex business, one that melds manual dexterity with state-of-the-art technologies.

WIRING, THE AIRCRAFT'S NERVOUS SYSTEM

What would you see if you could look inside a person's body? A skeleton, muscles, organs and a nervous system that smoothly coordinates the entire body. Inside an airplane it's almost the same thing, with a skeleton, specialized organs and a nervous system in the form of electrical wiring.

Labinal is the world's leading supplier of aircraft wiring, with some 6,500 employees at a dozen facilities on three continents. It works with most of today's aircraft manufacturers, including Boeing, Airbus,

Bombardier and Embraer, and has developed expertise spanning electrical network design, production and installation. According to Labinal chief operating officer Bruno Durand, "For us it's very important to cover all three facets – design, production, installation – as part of the complete packages that subcontractors are increasingly asked to deliver."

Major restrictions

"The manufacturer specifies the aircraft's electrical requirements, overall architecture and the general routing patterns for the various bundles

of wires," explains Serge Blanchon, design director in the engineering division. "Based on these specifications, our design department then determines what types of wires will be used, groups them in harnesses, and routes them through the aircraft, suggesting to the manufacturer the best transit and attachment points. This is extremely meticulous work, and we call on powerful computer-aided design and manufacturing systems – or CAD/CAM – such as Catia V5."

An airplane contains a number of different networks – fuel, hydraulic,

oxygen, electrical, etc. – in a confined space. This means that design engineers have to be very familiar with overall aircraft construction, especially since safety standards mandate very specific separation minimums between the different networks. These constraints are even more daunting on helicopters and military airplanes, because of their narrow airframes and the high level of vibrations.

This initial design work leads to the fabrication of production templates that reproduce the airplane in two dimensions. The wiring harnesses will subsequently be assembled on these templates.

"We operate under very short industrialization and production cycles, about 25 days," notes Bruno Durand. "Electricity is the easiest aspect to change in an aircraft, and we use it as a variable to adapt to the unending stream of changes that occur in any aircraft program. In addition, airlines have a wide variety of requirements for their planes. Even on a single type of jetliner, there may be as many different wiring layouts as there are customers. So our production organ-

ization has to be both flexible and responsive."

Patience and dexterity

The challenge during the production process is to bring the right cable to the right place, at the right time and with the right information for the worker who's assembling the harness. It is also manual work that demands patience and dexterity, along with a highly structured organization and never-ending vigilance.

Labinal mainly calls on women for this job. Some of the operations are quite meticulous and women's smaller, more dextrous hands are better. A majority of the workforce at Labinal is female, with women accounting for 63% of the total at the Wiring Europe division, and 67% at the Wiring North America division.

However, installing the harnesses in the planes is a much more physically demanding job, and here men are in the majority. As Bruno Durand explains: "A technician needs at least one or two years of experience to be fully operational. Installation is a tough job, because of the working conditions inside the airframe

and the need to coordinate with so many other professions. Furthermore, there's a lot of pressure from the customer because wiring installation comes just before cabin completion, and then delivery to the airline."

All these constraints are hard on Labinal of course and are limiting the number of competitors. Any enterprise that wants to be a leading player in aircraft wiring has to demonstrate a daunting level of expertise, which takes a long time to develop. ■

THE A380'S WIRING AT A GLANCE

The growing role of electrically powered systems on commercial airliners has resulted in more and more wiring. Take for example the new Airbus A380 super-jumbo:

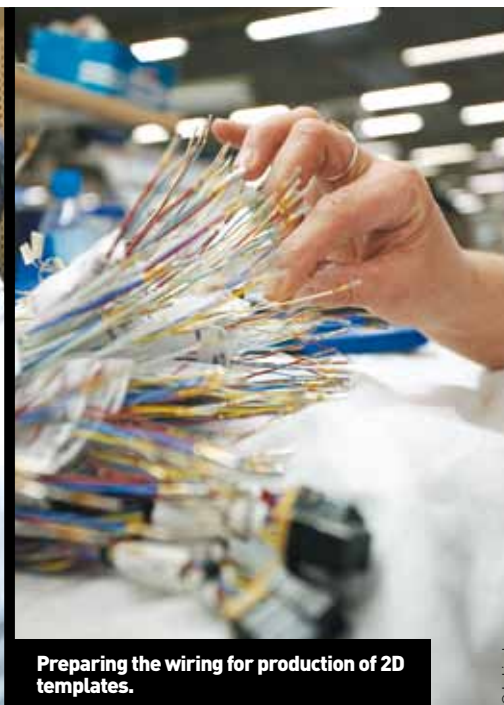
- 500 kilometers of wires
- 10,000 connectors
- 10,000 hours of production



Designing the routing path for wiring.



Over-braiding: making an insulating sheath that will shield wiring in sensitive areas of the airplane.



Preparing the wiring for production of 2D templates.



Installing the harnesses in the airplane.