

Mega Manufacturing

EPISODIC BREAKDOWN

1. Ep1 - Airbus 350

The Airbus A 350: the most modern commercial aircraft in the world. It takes 1800 highly-skilled specialists in Toulouse, France, and 2.5 million individual parts, delivered from all over the world, to assemble this masterpiece of aeronautic engineering. The goal: An aircraft with minimal consumption and maximum range. 53 percent of the Aircraft consist of a modern ultra-light composite material. But the innovative material also requires entirely new manufacturing processes. A challenge for the aircraft manufacturers in Toulouse. And the final assembly is preceded by a logistical masterpiece: The individual parts of the aircraft travel from various Airbus plants in Europe to Toulouse: the front and centre sections from Saint-Nazaire in France, the tail section from Hamburg, the wings from Broughton in Wales and Bremen, and the tail fin from Getafe in Spain. The factory in Toulouse is supplied with these parts by a specially developed transport aircraft, the Beluga. Several times a day, five of these machines commute between the various plants and bring supplies for production seven days a week from early in the morning until midnight. And the journey of the components is not over in Toulouse. By the time the A350 is fully assembled it will have passed through seven hangars or "stations." Given the extremely high number of components that have to be assembled and the large number of different suppliers, there are a lot of risk factors involved in the production of the A350. And the pressure is high: The modern aircraft is extremely popular with airlines, with 890 pending orders to date. Ten aircraft of the A350 have to leave the factory every month no matter what.

2. Ep2 - Sany Construction and Mining Equipment

Lingang, China. Home to one of the largest and most modern excavator factory in the world! 1000 square meters of production area, equipped with high-tech machines of the latest generation. By this means China's market leader Sany wants to become the number one in the world! For half a billion euros, the construction machinery giant has built the mega factory. Now 1,600 specialists ensure a breathtaking output: theoretically every ten minutes a new excavator can roll off the production line! In order to achieve the enormous number of strokes, the huge production halls are equipped with the latest generation of robots. They process up to 250 tons of steel every day. In some areas the robots have completely taken over the production of the excavators. In the state-of-the-art welding plant, for example, twenty-four workers were replaced by thirty-two robots. They do the work in half the time. And this is not the only advantage: they are more precise, safer and much more cost-effective in the long-run. Sany's top-seller in the mid-range class: the excavator SY215. Its price: one hundred and ten thousand euros. This makes it cheaper than any competitor model from Europe or United States. Its most spectacular feature: a blackbox that sends all of the recorded vehicle-data to the control centre in China. In real-time. The Chinese produce the twenty-three ton monster in just twenty-four working hours. The specialists have to work under extreme time pressure. This is also the case at the so-called "marriage section" - where the heavily

swaying, twelve-tonne upper part has to be moved with millimetre precision onto the narrow slewing ring. The specialists also have only ten minutes at this station. So that Sany can deliver excavators at record speed - on the way to becoming the world market leader.

3. Ep3 - Pierce Fire Trucks

It is the largest manufacturer of fire trucks in the world: Pierce Manufacturing in Wisconsin, USA. 1400 trucks are being built here every year – and each truck is one of a kind. Customers determine every detail from the first sketch on the 3D model to the finished truck. More than 13,000 individual components - most of them laboriously crafted by hand - are turned into an absolutely individual fire-fighting vehicle. Even the lettering and coats of arms so popular in North America are the result of Pierce's manual work with brushes and genuine gold leaf. All this is only possible with a lot of experience. The three thousand employees have on average twelve years of professional experience. After all, not just any product is manufactured here, but in case of emergencies their quality is a matter of life and death. The demands placed on a fire-fighting truck are correspondingly high: heavy as a truck, it must nevertheless be extremely manoeuvrable and fast. Take a mega-frame, a cab equipped with lots of high-tech, a high-performance water pump and a gigantic ladder: We accompany the production of a popular Enforcer fire truck from the very first step - the construction of the chassis - to the final acceptance by the customer. One of the highlights is the assembly of the TAK4 wheel axle. Developed in the military sector, it enables cornering at top speed without tipping over.

After approximately three months of production, the grand finale is the installation of a gigantic 33-meter turntable ladder on the roof of the Enforcer. A nerve-wracking task for the workers. Using two crane winches, they have to install the component, which weighs tons, with millimetre precision. No cable must be damaged. The final inspection shows whether the installation was successful. Then the customer receives his very own personal emergency vehicle.

4. Ep 4 - Pirelli Tyres

It is the most renowned tyre manufacturer in the world: Pirelli. Their capacity: 75 million car tyres a year. 32,000 employees worldwide, including 1,400 engineers. The most prestigious car manufacturers in the world rely on their experience. We follow the production of the P-Zero, Pirelli's flagship product. It takes: 100 constituent materials, fifteen manufacturing steps, and over 50 performance tests undertaken in high-tech laboratories. All for achieving the best possible compromise between three irreconcilable and contradictory properties: low rolling resistance, strong grip and low wear. Only then will the P Zero, take to the streets of the world. In Settimo Torinese, Italy, the company manufactures its high-tech tires on 200,000 square meters of floor space. Natural rubber is the basic raw material for around 130 years. But yet, a tire is so much more than simply rubber. The secrets of this Mega Manufacturing operation lie in the other ingredients too: A precisely measured blend of fillers, antioxidants, plasticizers, and curing agents. A car tire is a complex high-tech product with many individual layers. Up to ten different rubber compounds are required for different zones of the tire. Together with textile fibers and steel wires. Only then tires are able to withstand extreme stresses. A new tyre is specially developed for each car brand. The P-Zeros development is based on the experience gathered in the Formula One World Championship, for which Pirelli is the sole supplier. We make a detour to the development and testing department at Pirelli's headquarters in Milan and accompany a new P-Zero to the test track.

5. Ep 5 - Volvo

Trucks: Kings of the road with enormous power. Their manufacture demands a good eye, absolute precision and above all: perfect logistics. One of the world's largest truck factories is located in Belgium, close to the romantic town of Ghent. It's the ideal location, close to thousands of customers across Western Europe. This is where Volvo produces its bestseller: the all-time all-rounder "FH" - one of the most popular trucks in Europe with the most powerful engines in the industry! Approximately two hundred trucks each day! Each one unique: every truck leaving this factory is different: Mega Manufacturing individually tailored to customer requirements in a feat of logistical perfection. Timed to the minute. Around one thousand five hundred individual parts are installed by the workers in two hundred and ten operations over eight hours from the simple unadorned chassis - to a state of the art truck. This Mega Manufacturing takes huge amounts of energy. But suprisingly without CO2 emissions. Volvo Trucks in Belgium was the first carbon-neutral car factory in the world. As early as 2009. Green energy, perfect logistics, a gigantic, fully automated warehouse, modern robots: the factory is still high-tech. But nothing works here without well-trained people. Volvo Trucks calls themself a „people factory“. At the moment they are testing how to support their highly-trained workforces with new high-tech equipment: exoskeletons and virtual reality glasses allow workers and computers to become one! It could become the truck factory of the future!

6. Ep 6 - Porsche