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LYKAN HYPERSPORT, A TREASURE WITH AN ENGINE

When you've shown the world the most powerful vehicles on the market and you've done impossibly acrobatic maneuvers with them, it's difficult to improve on that. Nevertheless, in *Furious 7* the franchise made a quantitative leap with a very special guest: the Lykan HyperSport, one of the most expensive cars ever built.

After Dominic Toretto and his team have carried out a frenetic rescue operation to snatch the computing expert Ramsey from the grip of the lethal mercenary Mose Jakande, they discover that they haven't got very much further in their search for God's Eye, a sophisticated tracking device that every major world power is itching to get its hands on. Ramsey confesses that, for security reasons, she sent the device by post to her friend Safar in Abu Dhabi, the capital of the United Arab Emirates. When the whole team goes there, they discover that Safar has sold the device. Ramsey tells him that it's imperative to get it back, to which the young man replies that he sold it to a billionaire prince who decided to fit it in one of his most highly prized possessions, a deluxe car that he keeps hidden in a vault in his attic apartment on the 80th floor of the building. Under cover of a party, the team will have no option but to sneak in and try to retrieve the device.

FROM FERRARI TO LYKAN

When vehicle coordinator Dennis McCarthy was told that they needed a super deluxe car to hide the God's Eye in, he immediately thought about Ferrari. The possibility of including one of this company's racing cars in the franchise seemed like a dream to him. However, McCarthy ultimately set his eyes on the first super sports car built in the Middle East: a Lykan HyperSport valued at $3.4 million, no less.

"We needed something different, something you don't see every day, and the Lykan seemed like a perfect automobile for the scene in Abu Dhabi," says McCarthy,

In the seventh edition of the *Fast & Furious* saga, the team decided to include one of the most exclusive sports cars in the world - the incredible $3.4-million Lykan Hypersport, created by a Lebanese company, "W. Motors".

Lykan HyperSport, a treasure with an engine



The Lykan's role in the film was not just to look good. In one amazing scene, Dom Toretto accelerates the car through a plate glass window and jumps from one skyscraper to another in the city of Abu Dhabi.

"where we encounter the vehicle inside a vault, admired as if it were a work of art, instead of being used as an automobile. I spoke with Ralph Debbas, the CEO of W Motors, the company that created the Lykan, and we had a passionate conversation because we both understood that the car fitted the story perfectly. The billionaire prince in the film is the kind of person who would drive his Bugatti to the door of a Starbucks, but who leaves his little masterpiece parked in the attic, among his most valued paintings."

A LUXURY THROUGH AND THROUGH

The appearance of the Lykan on the film set created huge expectation among the whole crew. As they found out about the car's peculiar features, they all came over and photographed it.

"I had never seen the Lykan before," admitted Jack Gill, the stunt coordinator, who had to fit the luxurious car into a pulsating, crowded action scene. "It was the first time I saw it and it was an incredible experience."

The British designer Anthony Janarelly conceived this wheeled wonder for the Lebanese company W Motors, which presented it officially at the Qatar International Motor Show in 2013.

"The Lykan is one of the most exclusive cars in the world, a modern machine with a touch of humanity," says Ralph Debbas. "Only seven have been manufactured. It has a 3-litre twin turbocharged 6-cylinder boxer engine, giving 780hp and 1,000Nm of maximum torque. It's one of the fastest cars in the world."

This vehicle, capable of reaching a top speed of 394km/h, is not only awesome because of its technical characteristics. It has some details that make it truly unique.

"The car's headlamps are made of white gold, diamonds and blue sapphires," Debbas continues, proud of his creation. "You can choose any precious stone you like to match the color of the car."

Of course, this work of pure craftsmanship – its carbon fibre bodywork is handmade – which among other advances, presented the first holographic display with motion control installed in front of the driver's eyes, is a vehicle that very few people can afford.

"It's really expensive," McCarthy admits, "definitely the most expensive car we have ever used in the *Fast & Furious* franchise."

SIX REPLICAS

Despite its power, the Lykan is obviously not designed to leap between skyscrapers as the script demanded. In the movie, once Dom and his team manage to get into the party, they try to take the God's Eye out of the car. But when the alarms go off and an entire army comes running ready to arrest them, Toretto can think of nothing better than taking the car with them. How to do it? By launching it at top speed against one of the windows and leaping with the car into the building next door. Totally reckless!

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ALI FAZAL

Born in Lucknow, India, on October 15, 1986, he began appearing in television commercials at a very young age, and this got him interested in acting. He enrolled at The Doon School in Dehra Dun to study drama, and he was discovered there by the film director Rajkumar Hirani, with whom he made his performing debut in the comedy film *3 Idiots* (2009), which was a big hit. From then on, Ali became a familiar face in Bollywood productions, scoring major successes in films like *Always Kabhi Kabhi* (2011) and *Fukrey* (2013). His growing popularity eventually opened the doors of American and European cinema to him. Thus, in 2015 he got the part of Safar, who plays host to Toretto's team in Abu Dhabi in *Furious 7*. Later, director Stephen Frears entrusted the leading role to him, together with the veteran Judi Dench, in the biographical drama, *Victoria & Abdul* (2017), for which he received very good reviews. Back in India, Ali has continued to star in a string of films, comedies especially, and he has also been able to make more international appearances, for example as part of the ensemble cast in the new version of the Agatha Christie classic *Death on the Nile* (2020).

Of course, doing this scene with an original Lykan was out of the question.

"W Motors built six replicas of the car for us in its factory," McCarthy explains. "They used glass fibre instead of carbon fibre, and left out the deluxe extras that the main vehicle has."

While the original Lykan was used to film the shots of the vehicle standing still, which made it possible to admire all of its beauty in absolute safety, the replicas equipped with Porsche 300hp engines were used when the vehicle sprang into action, bursting in with the party in full swing. To make a sports car like this move across a marble floor surrounded by hundreds of extras in party dress was a real challenge for the stunt performers. However, not satisfied with that, the director of the film, James Wan, wanted Deckard Shaw to burst in just at that moment and begin firing on the car driven by Toretto. It's a really explosive moment, which was developed and filmed on the set just as audiences saw it later on the screen.

"In general, what you see on the screen is actually what is happening," McCarthy assures us.

Everything except for the big jump and flight of the Lykan between the skyscrapers, something that logically had to be done with computer generated special effects.

Capable of accelerating to 394km/h (245mph), the Lykan was the perfect car to star in one of the most electrifying scenes ever seen in the *Fast & Furious* saga.



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A 1949 four-door Dodge Coronet sedan. With this model, the most deluxe of the three that were offered on the same chassis, the brand's sales figures recovered after World War II.

DODGE CORONET 1949-1956 MODEL

Production was resumed after World War II, and in 1949 the brand launched a new line of models called, in order of features from the least to the most, the Dodge Wayfarer, the Dodge Meadowbrook and the Dodge Coronet. The last one, offered in five different types of bodywork and with a single engine, was the top of the manufacturer's range.

An elegant 1956 Dodge Coronet station wagon, with two-tone bodywork and the appearance, in station wagons too, of vertical rear tailfins.

After World War II, American manufacturers offered a single combination of engine and chassis, on which they developed a complete range of bodyworks and finishes. In the case of the Dodge brand, the chassis of longitudinal beams and cross bars, had a wheelbase of 3.13 metres, and the engine, a 3.8-litre straight six, gave slightly over 100hp. On this base, three virtually identical models were developed, but with different equipment: the Dodge Wayfarer (its chassis was somewhat shorter), the Dodge Meadowbrook and the Dodge Coronet. The latter, the most complete and deluxe, had five types of bodywork: two with two doors (coupe and hard top) and three with four doors (sedan, eight-seat limousine and station wagon).



As part of the plant was set aside for the production of military materiel for the Korean War, the car underwent very few changes (all aesthetic) until 1953, when the bodywork was redesigned and the option was added of a 3.9-litre V8 engine with hemispherical cylinder heads. That year, moreover, it became the intermediate model since the Dodge Royal was added above it, and the Dodge Wayfarer was deleted. After 1955 the Dodge Coronet was completely redesigned, with the first vertical rear tailfins appearing on one of the brand's models.

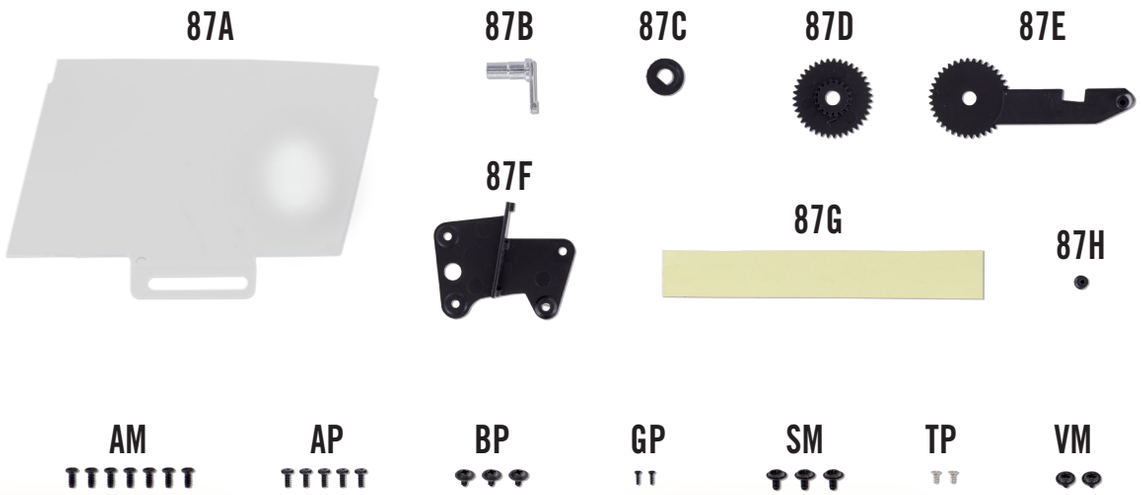
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THE LEFT DOOR WINDOW (II)

In this assembly session you will continue working on the left door window. Please follow our assembly instructions and accompanying illustrations carefully.

PIECES FOR THIS STAGE



87A Left door window glass
87B Window crank
87C Window cog 1
87D Window cog 2
87E Window cog 3
87F Window regulator cover plate
87G Window weatherstrips (×2)
87H Crank knob

AM Screws 2 × 4mm (× 7)*
AP Screws 1.7 × 4mm (× 5)*
BP Screws 1.7 × 3 × 5mm (× 3)*
GP Screws 1.2 × 3mm (× 2)*
SM Screws 2 × 4 × 5mm (× 3)*
TP Screws 1.5 × 3mm (× 2)*
VM Screws 1.7 × 2,5 × 5mm (× 2)*

* Some of the parts are spares.

Editor's note: The parts shown here may differ slightly from the parts supplied with this issue. This does not affect the quality or the assembly instructions in any way.

ASSEMBLY AREA

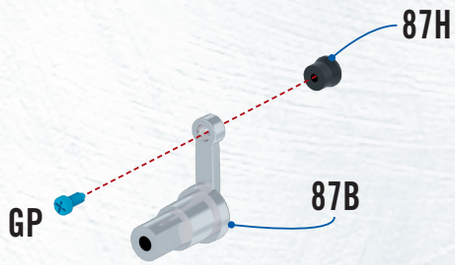


LEFT DOOR

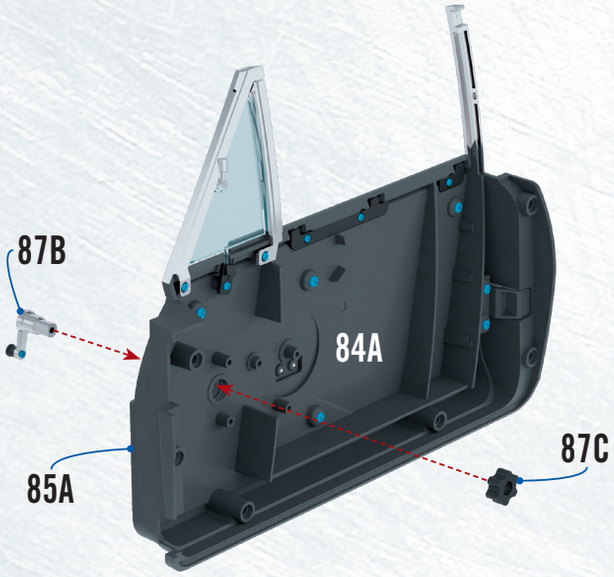
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The left door window (II)

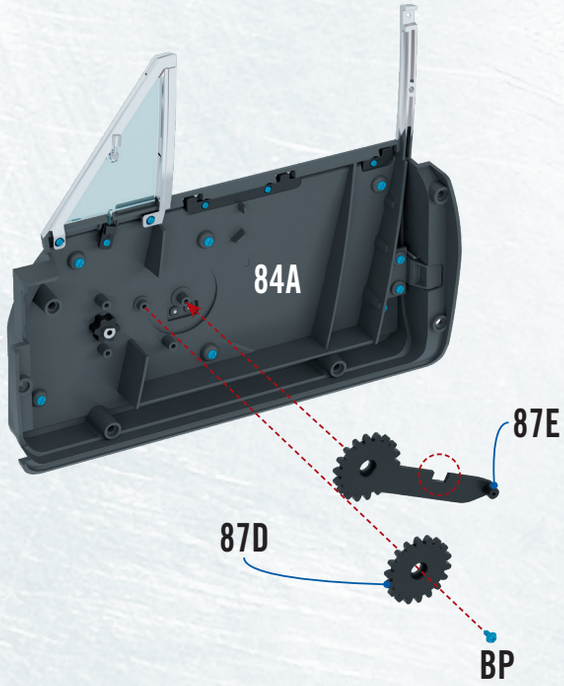
87.1 **ATTACH** the knob **87H** to the left door window crank **87B** and secure the pieces with a **GP** screw. ▶

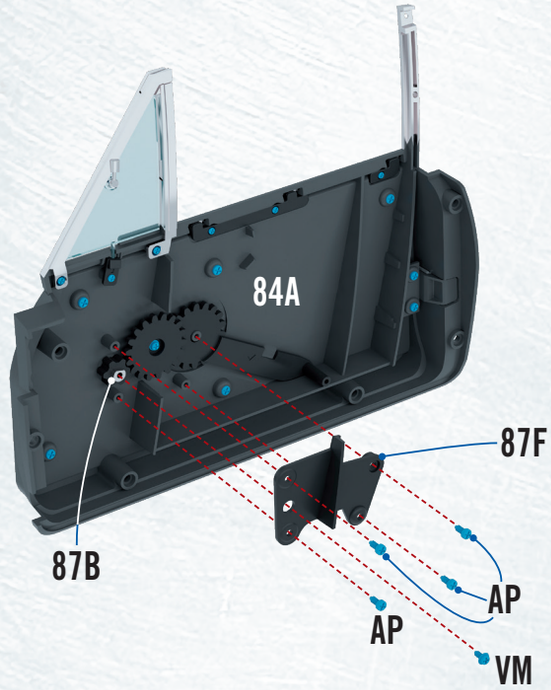


87.2 **INSERT** the crank **87B** into the hole on the inside of the door, as shown in the illustration. From the outside of the door, slide cog 1 **87C** onto the end of the handle. ▼



87.3 **ATTACH** cog 3 **87E** to the middle post on the inner section of the door **84A**, ensuring that the rectangular notch in the piece in question is facing upwards. Now attach cog 2 **87D** to the adjacent post and secure the piece with a **BP** screw. ▼



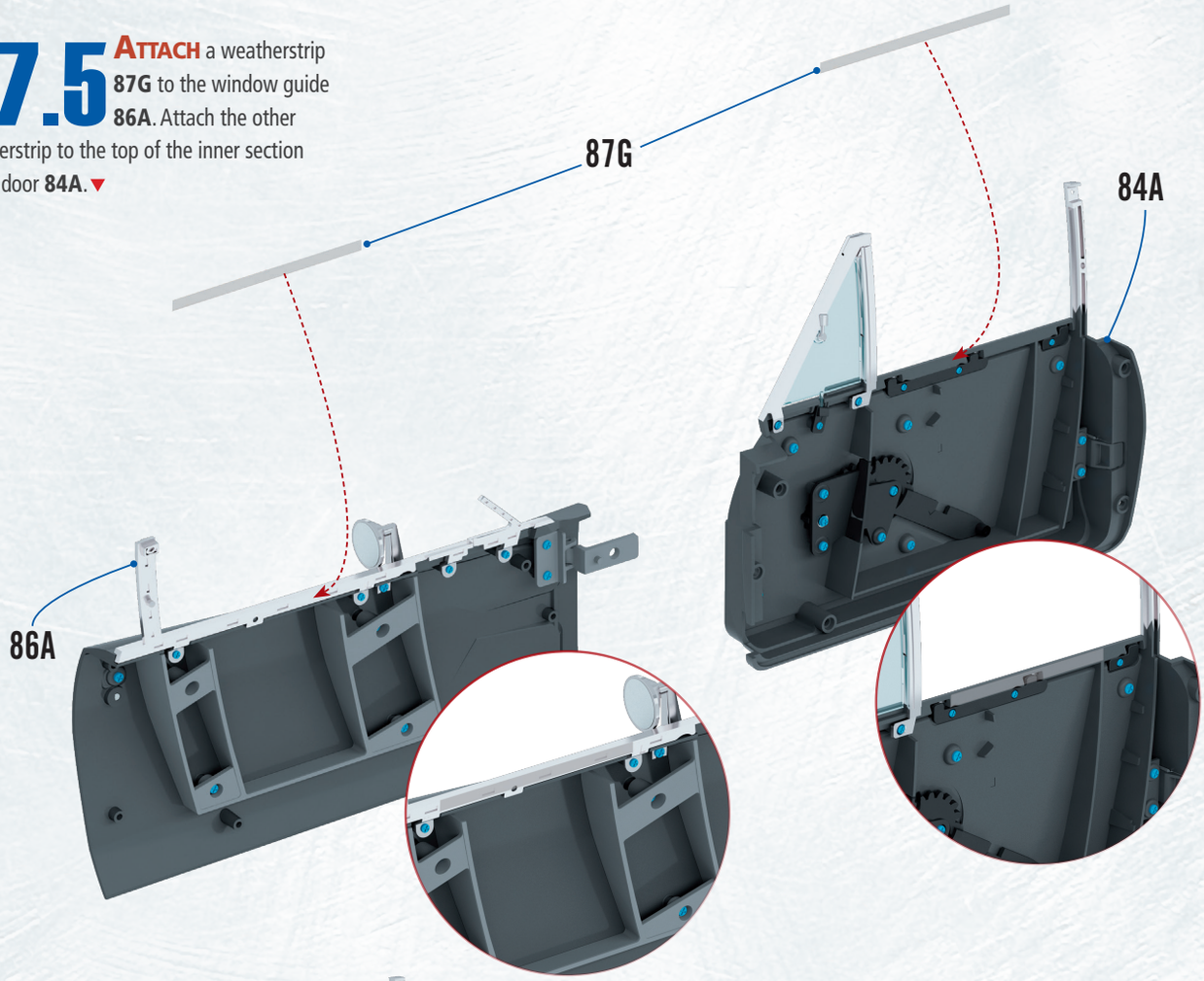


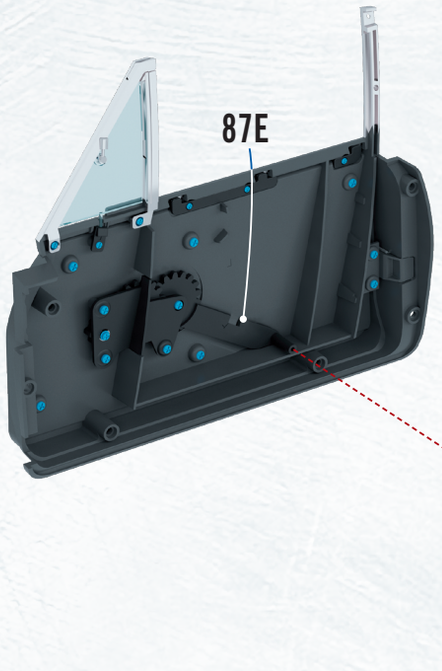
87.4 **PLACE** the window regulator cover plate **87F** over the cogs, aligning the five holes with the four holed posts on the inner section of the door **84A** and the hole in the crank **87B**. Secure the piece with four **AP** screws and one **VM** screw (for the crank). ◀

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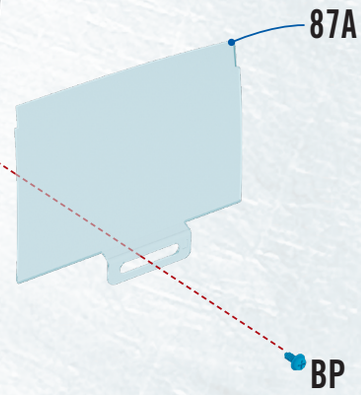


87.5 **ATTACH** a weatherstrip **87G** to the window guide **86A**. Attach the other weatherstrip to the top of the inner section of the door **84A**. ▼



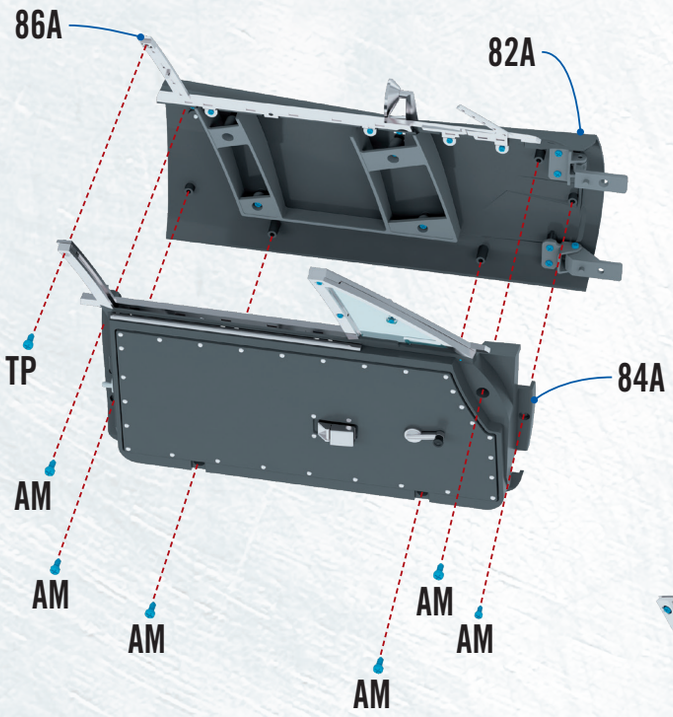


87.6 **ALIGN** the tab with the rectangular opening in the glass **87A** with the post on the end of cog 3 **87E**. Use a **BP** screw to secure the glass to the post. ◄

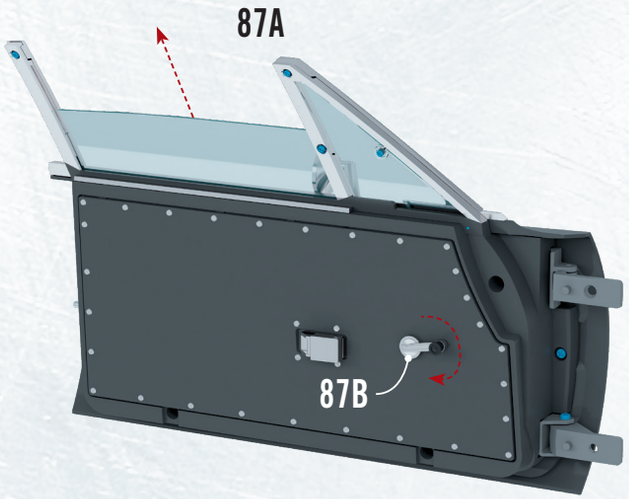


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The left door window (II)



87.7 **JOIN** the two parts of the left door together, aligning the holes and linchpins. Secure the pieces with six **AM** screws, and one **TP** screw for the top of the window guide **86A**. ◀



87.8 **YOU CAN NOW** test the window lift mechanism, which lifts and lowers the window by simply turning the crank. ▶

RESULTS OF STAGE 87



You have now attached the window and the regulator to the left door. Keep everything you assembled in this session in a safe place.

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DO NOT UNDERESTIMATE COMPONENT FATIGUE



When an engine fails, in most cases the fault can be attributed to component fatigue. In this edition, we shall look at the phenomenon, ways of avoiding it, and above all, some advice to follow when assembling components.

When performance increases, so does the risk of fatigue, and therefore it is essential to use the highest quality components, which can guarantee a longer life. The breakage of metal components is caused by metal fatigue that occurs when parts are no longer able to withstand the continuous stresses. It happens suddenly and without warning. Many components of competition engines are automatically replaced after a certain number of hours of use, without even checking them. This is not because of excessive wear, but because their continuous use under stress could lead to fatigue failure.

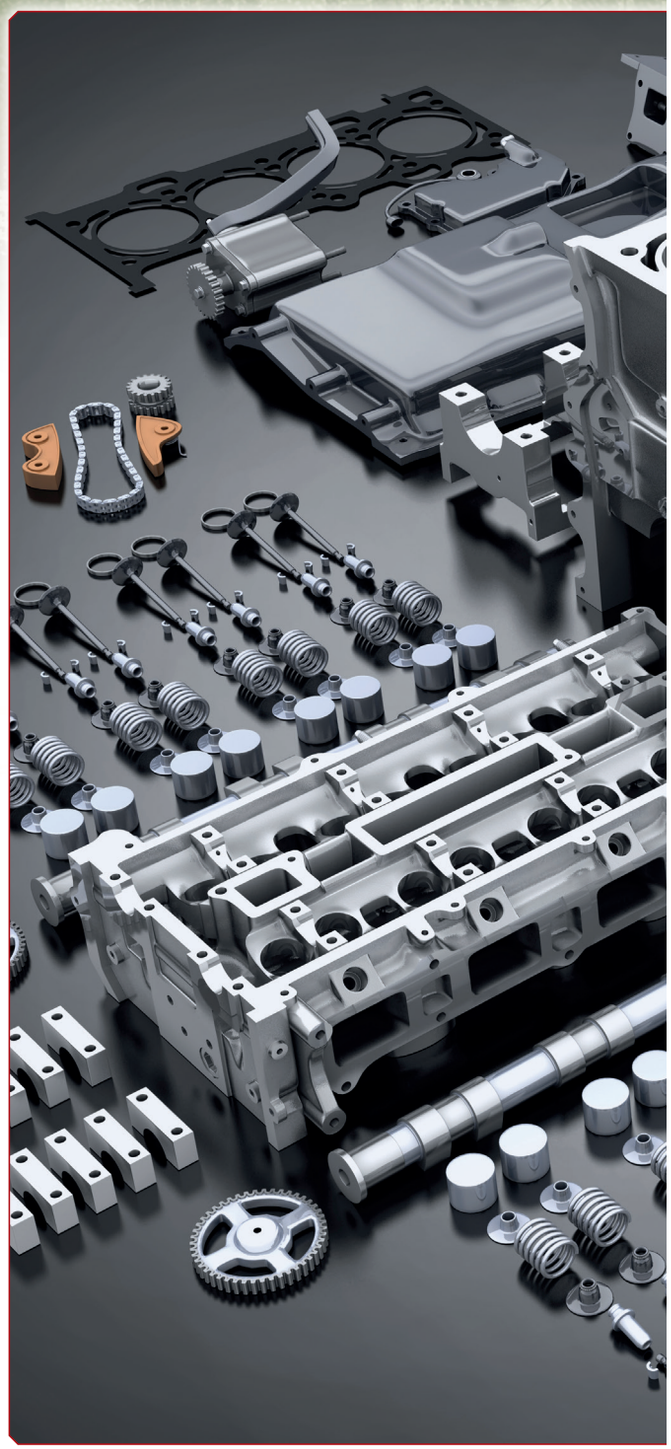
These calculations are also applicable to standard cars, with instructions from manufacturers to replace

The connecting rods of high-powered production engines are made of steel and have a shape that is designed to prevent the concentration of stresses and to reduce fatigue as a result.

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Do not underestimate component fatigue

certain parts after reaching a certain number of kilometres. For example, take the case of belts: while they may seem to be in good condition when visually inspected, it is always better not to take risks, because they can snap without warning. Another example is the rolling bearings, which are subject to failure due to fatigue and not due to exceeding a predetermined wear limit. The problem is not so much the slow and gradual degrading of material on the working surfaces - the rolling elements and the raceways - but their reaching a given number of operating hours, after which the risk of failure quickly becomes unacceptable. The concept of "prevention is better than cure", or the "Safe-Life" criterion that is borrowed from the aeronautical world, determines the theoretical maximum lifespan of a component before a failure occurs, especially if it is made of metal. For safety purposes, it does not matter whether this theoretical lifespan is long, but that it is well known, so that the component can be replaced within a known safe time scale. Obviously, the fight against fatigue assumes extreme importance in the case of highly tuned or racing cars, whose components are subjected to particularly high stresses.



STRESS AND REST

Fatigue occurs when a component is subjected to continuous variable loads over a period of time. In some cases, stress is always from the same direction (as with stretching) and of different intensities. In other circumstances, resting conditions can alternate with stresses of the same type and intensity. The worst cycles, however, are those with an inversion of the stress, when, for example, the mechanical part has to flex one way and then the other. Under these conditions, after a series of cycles, the component breaks under a load that is much lower than the normal breaking load of the material itself. In other words, for an element to break in the presence of static stress, it just needs to reach a certain predetermined value, while with fatigue (i.e. continuous stress that is repeated over time), the breaking point will be a significantly lower value.

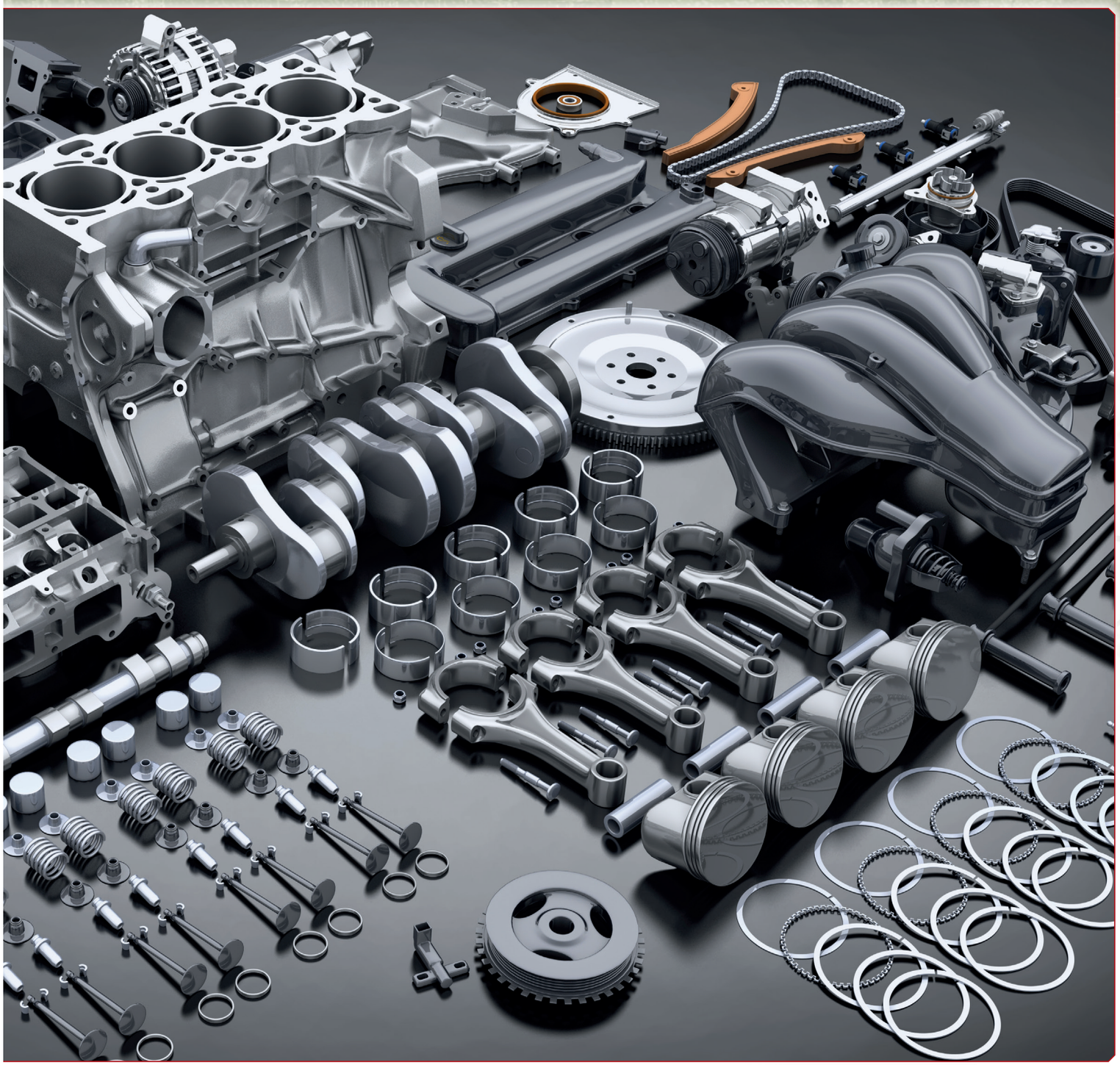
SUDDEN FAILURES

To explain fatigue, take an object that we all recognise - a coat hanger made of metal wire. As you probably know, it is possible to break it quite easily without pliers or cutters, simply by bending the wire back and forth by hand. By so doing, we create fatigue failure and the wire snaps.

Returning to the world of engines, the phenomenon normally begins on the surface of components, most of the time where there is an irregularity - the border of a hole or of a sharp edge. In technical jargon, a "micro crack" forms, which then gradually spreads towards the central part of the component.

Take, for example, a part that is stressed alternately by stretching and compression: each time it is "pulled" (stretched), the crack tends to open. As the cycles continue, the micro separation between the two parts will

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lengthen more and more, travelling toward the centre, thus reducing the useful area of the part.

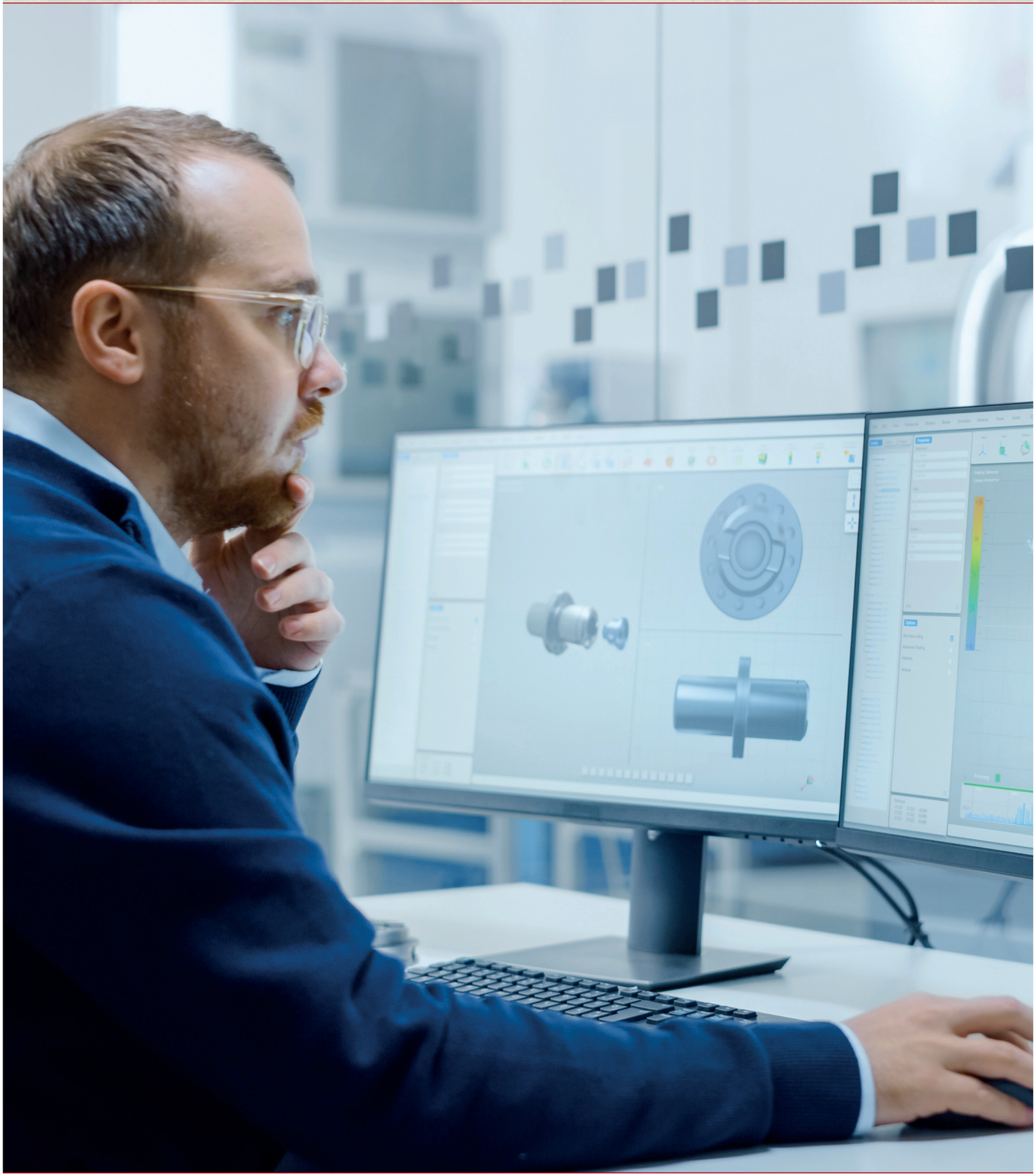
Eventually, a break will occur, and it will happen in the presence of a stress level that is much lower than the piece was able to withstand when it was manufactured. When we inspect the engine, we will immediately see that fatigue has led to the failure, as the surfaces will have an unmistakable appearance.

DANGEROUS IMPERFECTIONS

To avoid fatigue problems, perfect machining is very important, as even the smallest surface imperfection can reduce fatigue resistance. This is why the pieces must be machined with great accuracy and why reduced roughness is advantageous. This aspect was well known to the engine tuners of the past, who always polished the connecting rods if these were intended

The fundamental parameters that identify the life cycle of the components are represented by the magnitude of the stresses that they must withstand and by the expected number of cycles they will endure.

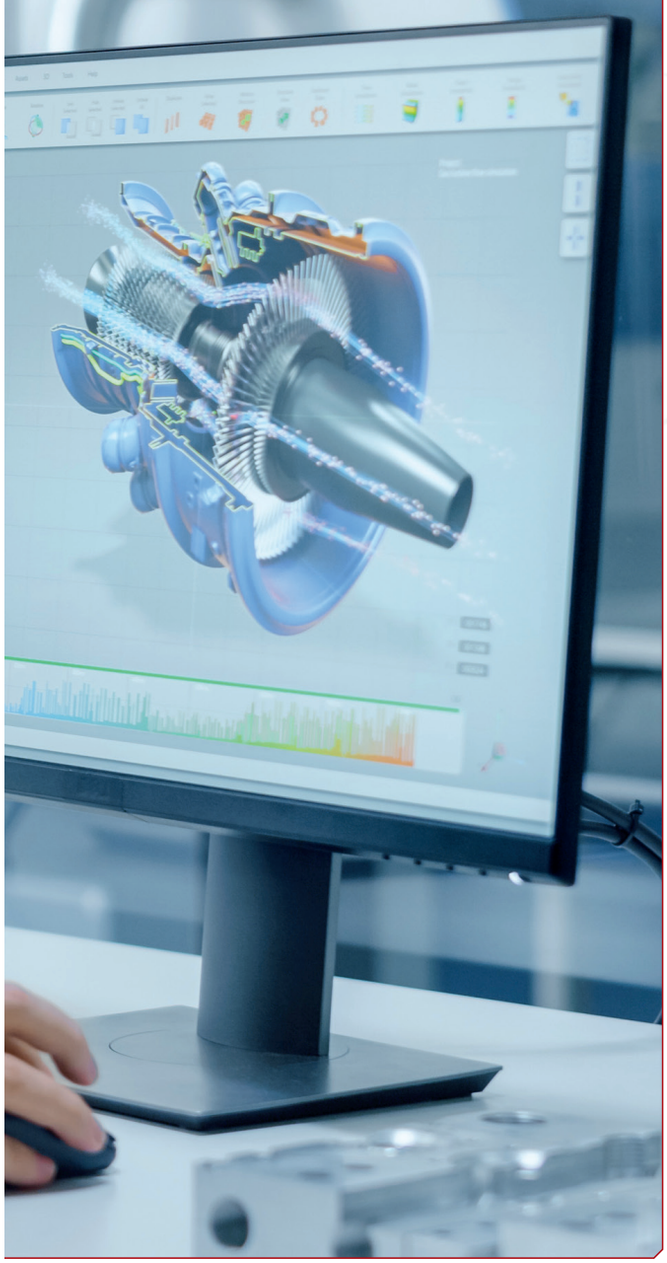
Do not underestimate component fatigue



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Handle with care

The components most subject to breakage due to fatigue are undoubtedly the connecting rods. They must be treated with the utmost care. Avoid marking the surface, either voluntarily or accidentally by dropping them. If you have to mark them, use a soft marker pen! It is not uncommon for connecting rods to break due to not being handled properly. It may seem insignificant, but even a small bump against the cylinder barrel during insertion is enough to form a micro crack that is invisible to the naked eye. Over time, this can lead to sudden failure.



for a highly tuned or racing engine. On the one hand, this process gave the surface a better finish, and on the other, it made it easier to identify any small cracks. However, when these cracks are really tiny, the naked eye is not enough and penetrating liquids are needed to detect them.

HOW TO FIGHT FATIGUE

The best system for increasing the fatigue strength of metal components, beyond the care taken in the design and manufacturing phase, is undoubtedly controlled shot peening. This term refers to a procedure of high-speed bombardment of a metal component with thousands of small balls (shot) of a hard material, usually steel. It is done with sufficient force to create plastic deformation of the surface of the part and is used to strengthen and relieve stress in components like steel automobile crankshafts and connecting rods. By reducing the surface stress, it provides extraordinary protection against the risk of fatigue failure. The treatment requires careful evaluation by experts in the sector, who can calculate the intensity of the "bombardment" required, its duration, and the size and type of shot.

It is called "controlled shot peening" because it must be carried out in a carefully pre-established and rigorously monitored way. The increases in fatigue resistance are enormous. In the case of springs, there can be an improvement of up to 1,300%! For this reason, shot peening has gradually replaced the practice of polishing racing car connecting rods.

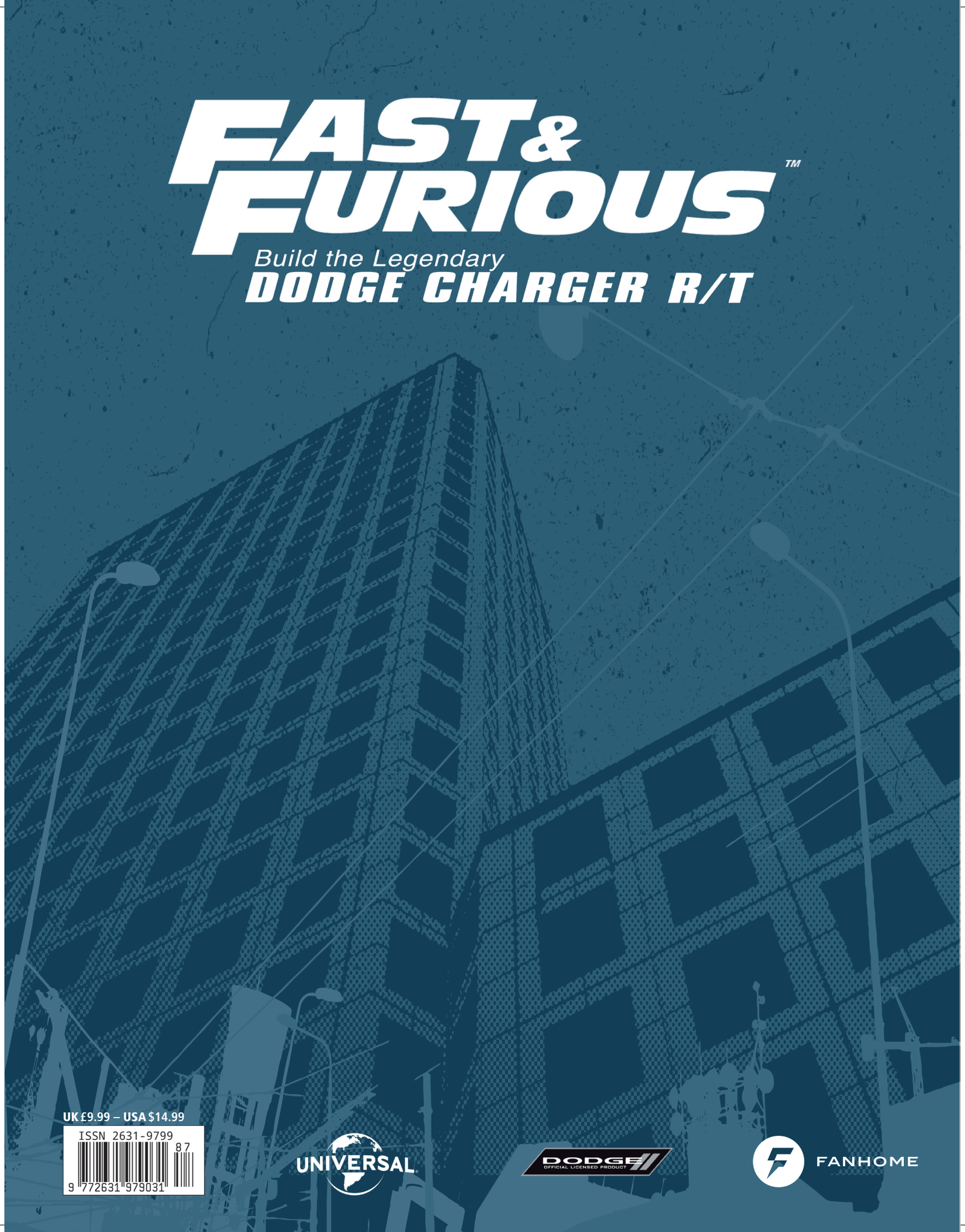
Right from the design stage, careful attention must be paid to everything that can cause concentrations of stress. "Fracture mechanics" is the field of mechanics concerned with the study of the propagation of cracks in materials.

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