This press pack accompanied the UK launch of the fourth generation Supra in 1993. Changes to the model during its time on sale can be tracked using the Timeline feature on the Supra archive web page. More information about the Supra range can be obtained from the Toyota press office.

Supra Press Information

FOR IMMEDIATE RELEASE

August, 1993

THE NEW TOYOTA SUPRA

SAFE AND LUXURIOUS HIGH PERFORMANCE

The new Toyota Supra is an entirely new car. It shares nothing with the previous model of the same name except for its powerful front engine, rear wheel drive and two plus two seating configuration. It is the most powerful production car Toyota has ever built but that power is tamed by its advanced computer controlled technology to make it not only a very fast car, but also a very safe and easy car to drive. The only option is the choice of a six speed manual or four speed electronic transmission. In either case, it is priced at £37,500 inclusive of VAT. The Supra goes on sale in the UK on August 24, 1993.

With a 24 valve, twin camshaft straight six engine boosted by two sequential turbochargers, the Supra is a powerful car. 326bhp at 5,600rpm will take it to an effortless 155mph - and way beyond that if the car wasn't restricted. Just as important is the 325 lb ft of torque with some 90% of it available from only 1,300 revs. It will reach 60mph in just 4.9 seconds.

TOYOTA

more...

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Power is transmitted via a new six speed cross ratio manual transmission jointly developed by Toyota and Getrag of Germany. Alternatively, there is a four speed automatic transmission with a manual function. A limited slip, torque sensing differential controls the power supply to the rear wheels.

In producing a very fast and powerful car, inherent safety was of the utmost importance. Apart from being light and easy to drive in city centres and on the open road, the Supra has been designed with considerable attention to active and passive safety. Passive safety measures include a body structure incorporating CIAS - crash impact absorbing structure - designed to dissipate the force of an impact throughout the body of the car. The passenger compartment is a very rigid cell which of course, includes side impact beams. The bumpers are of a sponge-like material supported by steel beams on impact absorbing mounts. Even the bonnet has been specially designed to minimise the chance of windscreen penetration.

Primary protection is provided by three point seat belts and a steering column which will deform deliberately to absorb impacts and protect the driver. In a severe crash, driver and passenger airbags, controlled by computer, protect the front seat occupants.

But it is far more important to avoid an accident in the first place. The Supra's double wishbone suspension ensures

more...

very high levels of grip even in the wet and contributes to outstanding stability in a straight line, when cornering and under braking. The brakes are specially ventilated discs with four piston calipers at the front and - a Toyota innovation - lateral G-sensing ABS to control braking on the front and rear wheels independently as well as on the inside and outside wheels during cornering. The risk of skidding and oversteer is reduced by the use of the limited slip differential and electronic traction control. This reduces the power to the rear wheels when wheel spin is detected to prevent loss of traction.

The speed sensitive power steering is very direct and an active front spoiler and high rear spoiler create downforce for extra stability. Finally but by no means least, the projector headlamps are amongst the brightest in the world.

A sports car of this configuration needn't be a heavyweight. A special team was designated during the development process to reduce weight wherever possible for better performance and fuel efficiency. Despite the extra weight of air bags, traction control, advanced ABS and bigger wheels and tyres, the extensive use of aluminium and other lightweight materials (including hollow carpet fibres) has kept the weight of the Supra to below 1,600 kg - lighter in fact, than the model it replaces.

Sports cars needn't be noisy or rough. The new Supra delivers strong performance with the kind of refinement that

more...

has become a Toyota hallmark. The use of alloy and fluid filled mounts for the engine and differential, along with subframes and asphalt sheeting, help to insulate the cabin from any noise and vibration. The Supra also uses vibration and noise damping sandwich steel sheets first seen in the Lexus LS400.

Inside, the Supra is smooth and quiet with only the distant muted roar of the engine and big, single exhaust giving a hint of its capabilities. The fascia is cockpit-like with all controls falling easily to hand. The tachometer is the largest, central gauge. Upholstery and trim are leather as standard equipment. Standard too is a six speaker audio system and climate control automatic air conditioning and heating. The front seats are heated and the driver's seat has power adjustment. Cruise control is also standard. Naturally, so too are electric windows and central locking along with a sophisticated security system and immobiliser.

Despite its performance potential, the new Supra engineers had environmental considerations high on their list of priorities. The air conditioning system uses non-ozone damaging R134a and the engine complies with the strictest exhaust emission standards with a three way catalytic converter. In total, the number of parts used in the Supra was reduced by 41.4% compared with the old model (some parts are shared with the Lexus SC400 coupe/Toyota Soarer) and at least 80% of the car is easily recyclable. Plastic and resin parts are marked for easy recycling. Despite its power output, the Supra is very fuel efficient for its class, recording 36.2mpg at 56mph.

more...

An essential element of any sports car is style and the new Supra has it in abundance. The striking shape is aerodynamically efficient and was conceived by Toyota's central design studio in Japan under designer, K. Uchida who was responsible for the Lexus LS400 and ES300. The final design was also influenced by the Calty studio in Newport Beach, California. The chief engineer for the Supra project was Isao Tsuzuki.

In the UK, only 25 selected Toyota and Lexus dealers will sell the Supra although all Lexus dealers will be fully trained to provide aftersales service. Only about 250 will be imported in a full year, making the Supra a rare and exclusive grand touring sports car.

In keeping with the extremely high dynamic potential in the new Supra, Toyota is offering an advanced driving course designed to help owners gain the maximum driving pleasure with the maximum safety. The course has been developed specially with the John Watson Performance Driving School, based at Silverstone circuit in Northamptonshire, and will be available as an optional extra (£260).

The one-day course includes a variety of disciplines which can be taught within the safe environment of the track in preparation for real on-the-road situations; instruction on the road is included in the day. Tuition is on a one-to-one basis,

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in the customer's own car (except for skid training, where a specially adapted vehicle will be used) with ex-Grand Prix winner John Watson's highly trained instructors.

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For further information, contact Simon Small, Press Office, Tel: 0737 768585.

Supra Press Information

FOR IMMEDIATE RELEASE

August, 1993

TOYOTA SUPRA

EQUIPMENT SPECIFICATION

Exterior

Alloy wheels

Colour keyed bumpers and door mirrors

Heated door mirrors

Tinted glass with top shaded laminated screen

Rear spoiler

Front active spoiler

Halogen headlamps and integrated fog lamps

Interior

Four-way adjustable driver's seat with power slide and recline

Manual height adjustment

Two-way manual adjustable passenger seat

Power windows

Central locking with remote control

Cruise control

Driver and passenger air bags (60 litres)

Automatic air conditioning

Anti-theft system including immobiliser

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AM/LW/FM stereo electronic radio plus cassette, six speakers and power aerial

Leather upholstery and trim

Heated front seats

Folding rear seat back

Tilt adjustable steering column

Cockpit headlamp levelling

Auto-off headlamps and illuminated entry

Door and ignition key illumination

Heavy duty rear window demister with timer

Full instrumentation including digital clock and outside temperature

Comprehensive warning lights including traction control indicator

Remote boot and fuel flap releases

Mechanical

Four channel G-sensing ABS

Electronic traction control

Limited slip differential

Speed sensitive power steering

Space saver spare wheel and tyre

Toolkit

Headlamp washers

Rear wash wiper

more...

TOYOTA SUPRA

TECHNICAL SPECIFICATIONS

Dimensions	
Overall length	4,515mm
Overall width	1,810mm
Overall height	1,275mm
Wheelbase	2,550mm
Front/rear track	1,520mm/1,525mm
Ground clearance	135mm
Front/rear overhang	950mm/1,015mm
Centre of gravity height	460mm (with driver)
	440mm (GVW)
Weights	
Kerb weight	1,585 kg (manual)
	1,595 kg (auto)
Gross vehicle weight	1,960 kg
Weight distribution front/rear	53%/47%
Roof rack load	30 kg
Boot capacity (VDA method)	185 litres (seat up)
	317 litres (seat down)
Coefficient of drag	Cd 0.33
Coefficient of lift front/rear	-0.01/-0.03
Fuel tank capacity	80 litres
Engine	Type 2JZ-GTE. Front mounted longitudinally. Alloy head, cast iron block. Two-way twin sequential turbochargers. 24 valves, 6 cylinder, double overhead cams.

more...

Bore and stroke		86mm x 86mm
Capacity		2,997cc
Compression ratio		8.5:1
Fuel system		Electronic sequential L-type fuel injection.
Power		326 bhp at 5,600rpm
Torque		325 lb ft at 4,800rpm
Emission control		3-way catalytic converter
<u>Electrics</u>		
Ignition		Digital, distributorless with 6 ignition coils
Starter		1.4 kW
Alternator		90A IC regulator (man.) 100A " (auto.)
<u>Fuel</u>		95 octane unleaded
<u>Transmission</u>		
Clutch		Single dry plate diaphragm hydraulic. 250mm dia.
Manual		6 speed + reverse type V160 (Getrag)
Ratios	first	3.827
	second	2.360
	third	1.685
	fourth	1.312
	fifth	1.000
	sixth	0.793
	reverse	3.280
Differential		3.266 (LSD) hypoid, torque sensing.
Automatic		Electronic 4 speed + reverse with torque lock up type A343E
Ratios	first	2.804
	second	1.531
	third	1.000
	fourth	0.753
	reverse	2.393

more...

Differential	3.538 (LSD) hypoid
Suspension	independent double wishbone with coil springs, gas dampers and anti-roll bars.
Front caster	3 deg. 30′
Camber front/rear	-0 deg. 20′/-1 deg. 30′
Toe-in front/rear	0.00mm/3.0mm
Spring rate front rear	73.5 N/mm 36.3 N/mm
Anti-roll bar front rear	30mm dia. 22mm
Damping rate front rear	2107/1274 N/mm 1372/637 N/mm
Steering	Variable speed sensing power assisted rack and pinion
Ratio	16.5:1
Turns lock to lock	2.8
Minimum turning radius	5.4 metres
Brakes	
Front	323mm dia. ventilated discs with 4 piston callipers.
Rear	324mm dia ventilated discs with 2 piston callipers
ABS	4 channel lateral G-sensing electronic
Parking/hand brake	190mm drum on rear.
Wheels and tyres	
Alloy wheel front	8" JJ wide x 17" dia.
Alloy wheel rear	9.5" JJ wide x 17" dia.

more...

Tyres	Michelin Pilots
front	235/45 ZR
rear	255/40 ZR
Spare	T145/70 R space saver

Performance

Top speed	155 mph (limited)
0-60mph	4.9 seconds (manual) 5.6 seconds (auto)
0-400 metres	13.4 seconds (manual) 14.0 seconds (auto)
0-1000 metres	23.5 seconds (manual) 24.5 seconds (auto)

Fuel consumption

Urban (l/100km)	19.1mpg (14.8) (man) 20.6mpg (13.7) (auto)
56mph (l/100km)	36.2mpg (7.8) (man) 34.0mpg (8.3) (auto)
75mph (l/100km)	27.4mpg (10.3) (man) 26.2mpg (10.8) (auto)

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For further information, contact Simon Small, Press Office,

Tel: 0737 768585.

Supra

Press Information

FOR IMMEDIATE RELEASE

August, 1993

THE NEW TOYOTA SUPRA IN DETAIL

EXTERIOR AND DESIGN

One of the essential criteria for a sports car is style, but once the basic lines had been decided, they were scrutinised for functionality. Every detail of the Supra had to be justified in terms of function and performance as well as for excitement.

The cabin section of the Supra looks more like that of a two seater, accentuating the sports feel of the car. The front and rear overhang are as short as possible. The wings bulge and grip the front and rear wheels. The new Supra is shorter, wider and lower than the previous model.

The newly added roof panel rain gutters reduce rain ingress. The large, grille-less air intake below the front bumper funnels air to the radiator and turbo intercooler and was designed to integrate smoothly and organically into the front bumper design. Since it takes in sufficient air to cool the engine, engineers avoided having to add an electric cooling fan, which would drain power and add extra weight.

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On the lower lip, the front air dam was developed to reduce the Cd and Cl figures and the active front spoiler assists in creating down force.

The side intakes, forward of the rear wheels, have been designed to cool the brakes and differential including the diff. oil cooler. To improve aerodynamics, the mirrors were attached to the doors, rather than to the "A" pillars.

The Supra's frontal appearance, with the elimination of retractable front headlamps, expresses a greater sense of individuality. The headlamp layout of high, low and fog (from inside out) was designed for functionality.

The rear end is of particular design significance. The broad, wrap-around look over the rear tyres creates a sharp, cut-arch image.

The rear spoiler achieves a stronger down force and greater stability. At this height, it does not interfere with the rear field of vision.

The rear combination lamps are a group of independent units containing four circular lenses (red, amber and white). Taking the rear field of view into consideration, the Supra's rear pillars and rear window form a large oval shape.

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BODY CONSTRUCTION

WEIGHT REDUCTION

Weight reduction was a priority in providing Supra with effective sports car capabilities. This commitment to reducing weight and the innovations it inspired contributed to giving the Supra one of the top power/weight ratios in its class. The engineers used finite element analysis of the body design on a super computer to ascertain maximum body weight.

The computer analysis helped to determine the best structure and shape of the Supra's monocoque body. It also helped suggest the placement and strength of reinforcement to optimise rigidity without incurring extra weight.

Despite the fact that dual air bag systems, ABS, traction control, wider tyres, differential oil cooler and front and rear spoilers were added as standard equipment, the following efforts helped to avoid any increase in kerb weight.

- The adoption of aluminium alloy components, knowing that aluminium is approximately five times lighter than steel:
  - engine bonnet
  - front bumper reinforcement
  - front suspension member and engine rear support member
  - front engine mounting

more...

- front and rear suspension upper arms
- wheels
- partial aluminium front and rear disc brake callipers
- heater core
- oil pan (etc...)

❑ The extensive use of other lightweight materials; for example the use of a revolutionary resin, composed of hollow beads, to make the rear spoiler as light as possible. Also, the fuel tank is now made of HDPE (high density polyethyrene). Thanks to the use of this plastic material, it weighs 4 kg less than conventional material and has a flexible form, thus minimising space requirements.

❑ The discontinuation of telescopic adjustable steering.

❑ The elimination of a dual exhaust system. It was replaced with a single exhaust system, since the dual exhaust did not offer a better performance.

❑ Making all components as simple and compact as possible, as for example the wide use of recessed and shortened bolts.

❑ The selection of component manufacturers who could supply the lightest parts. When components from different suppliers were of equal quality, Chief Engineer Isao Tsuzuki selected the lightest one.

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IMPROVEMENTS TO AERODYNAMICS

The Supra's body has been sculpted to make use of the passing air to press down on the vehicle at high speeds, improving its stability and handling. Supra had to retain sufficient down force to ensure the car remained stable at speeds of well over 150 mph.

The automatic operation of the active front spoiler depends on vehicle speed. When vehicle speed remains at more than 56 mph for over five seconds or exceeds 75 mph, the front spoiler drops down in order to reduce body lift. When the vehicle speed falls below 44 mph, the front spoiler retracts in order to prevent damage and reduce the approach angle.

Two manual switches are installed in the instrument panel: an off switch keeps the front spoiler retracted regardless of vehicle speed and a down switch can drop the front spoiler, when the vehicle is stopped, for cleaning or inspection. An indicator light comes on when the spoiler begins its extension, staying on when the spoiler is in its extended position. In case of malfunction, the indicator light will blink and the master warning light will turn on.

The front air dam aids aerodynamics by improving cooling of the radiator, the front brakes and the turbo's intercooler. The air contributes also to extra downward force when it flows over the rear spoiler.

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A new front wiper, with a large scoop fin on the driver side, effectively reduces lifting of the wiper during high speed driving.

IMPROVEMENTS TO APPEARANCE

Body panel joints have been reduced, due to the adoption of integrated, large body panels, improving body appearance. Jointless, one-piece body mouldings have also been adopted. Flush-fitting the headlamps and the windscreen and minimising gaps between body panels, ensure minimum air turbulence, reducing drag still further.

The one-piece moulded side body panels minimise the use of joints and welding. Precision manufacturing ensures the exact meeting of doors and bonnet to demanding tolerances.

IMPROVEMENTS TO DURABILITY

Galvanealled steel sheets have been widely applied for superior anti-rust performance. To protect the underside of the body, it is thickly coated with polyvinyl chloride. The front-end has a special application of anti-chipping primer for added protection.

A double-layer of zinc iron alloy on the body panels provides the ideal base for the multi-layer paint finish. It

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begins with a cathodic primer, followed by a base colour coat, with a clear coat to enhance the lustre and durability.

Extensive use of high tensile steel sheet, which accounts for 35.7% of the total body weight, enhances Supra's rigidity. Roof side weather strips are made from a new rubber material that has a low deterioration characteristic. Window mouldings are made with a new vinyl chloride material with high resistance to weather condition changes.

IMPROVEMENTS TO NOISE AND VIBRATION

Potential vibration inducing sources including the engine, suspension units and the differential case are mounted on subframes before attachment to the body. By mounting the engine on flexible mounts, less vibration is transmitted to the body and the passenger compartment. Using fluid within these mounts further dampens the vibration. Front suspension and rear engine supports are made from aluminium which helps reduce noise transfer.

Asphalt sheeting over the entire floor helps prevent noise from being transmitted to the cabin interior.

Sandwich vibration damping sheets (first seen in the Lexus LS400) have been adopted in the front bulkhead and rear wheel arches. In the dashboard, a composite of noise absorbing asphalt and steel sheet prevents noise infiltration.

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The engine and differential case both use a liquid-filled mount to minimise vibration at critical frequencies.

Considerable engine rigidity also contributes to low noise and vibration. In particular,

the high strength cylinder block and crankshaft,

the rigid crankshaft pulley with aluminium hub,

the stiffener plate-integrated aluminium upper oil pan.

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POWER TRAIN AND TRANSMISSION

The development goal for Supra's engine was the creation of a power plant capable of providing sufficient power for exceptional acceleration without compromising linear control or responsiveness.

Extensive R&D into fuel combustion, comprehensive weight reduction efforts and high-end engine management technology infuses the Supra engine with power and at the same time gives it fuel efficiency that sets it apart from other sports cars. In Supra, every component has a function, to ensure reliability and improve balanced performance.

THE ENGINE

Supra's 3.0 litre, 2JZ-GTE 2-way twin turbo engine gives the driver greater control. With 6-cylinders inline, it produces peak power of 326 bhp at 5,600 rpm and maximum torque of 325 lb ft between 4,600 and 5,000 rpm.

The engine has the advantage of achieving over 90% of this torque value over the most frequently used engine speed range, from 1,300 rpm to 4,500 rpm. In this way, it reduces the need for frequent gear changing.

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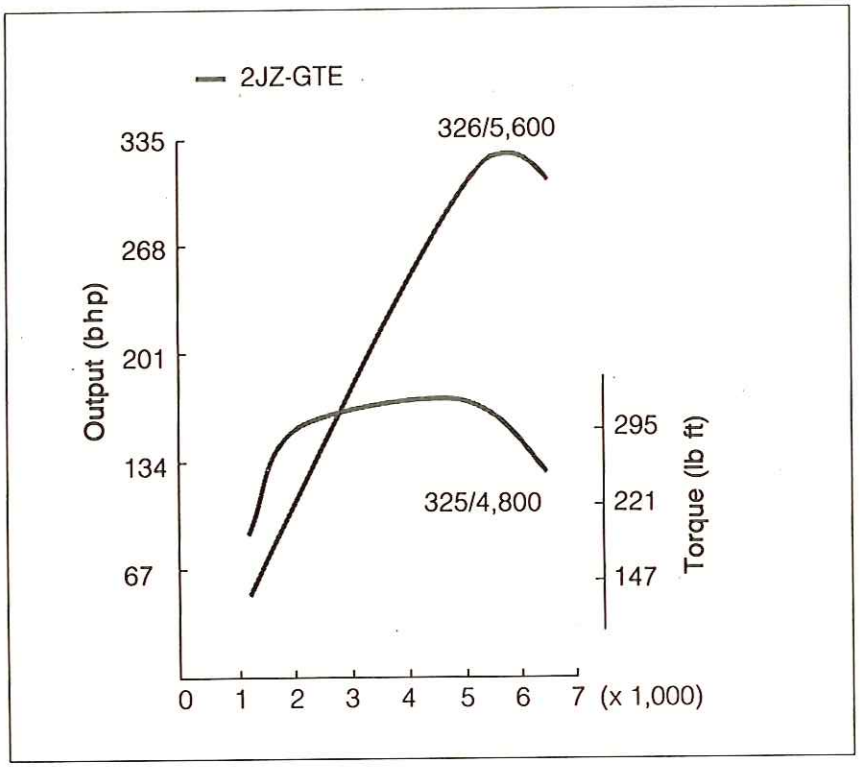

Toyota claims a time of 4.9 seconds in the 0-60 mph sprint - although the US magazine *Car and Driver*, has recorded 4.6 seconds. The top speed of well over 170 mph is electronically limited to 155 mph.

Supra has a weight to power ratio of 4.8kg/hp, putting Supra at the top of its class.

Power must be balanced with fuel efficiency. Official fuel consumption with manual transmission is 19.1 mpg. At a constant speed of 56 mph it is 36.2 mpg, and at 75 mph it is 27.4 mpg. Fuel tank capacity is 80 litres.

more...

Its distributorless direct ignition system is all electronic with the computer telling each of the six coils when to fire. High tension leads have been eliminated preventing high voltage transmission loss. Each coil is compact and lightweight, neatly incorporated into each spark plug cap.

The Toyota Computer Controlled System (TCCS) monitors a variety of factors, including engine speed, engine temperature, air temperature and engine load. This information is sent to a computer which then co-ordinates adjustments to the fuel injection and ignition systems.

The DOHC (twin cam) 24-valve engine uses 4 valves per cylinder. This helps to ensure high speed intake and exhaust efficiency. The lower sections of the aluminium alloy pistons are coated with resin to reduce friction.

Higher intake and exhaust efficiency is realised by a large valve diameter and a high valve lift.

The Supra's cast iron block was designed with eleven strengthening ribs which are hollowed out to provide passageways for lubricants and blow-by gas.

Reliability and durability of the engine are enhanced by a metal cylinder-head gasket and an Aramid fibre-reinforced timing belt. Automatic tensioners for both the timing belt and the serpentine accessory belt keep them at optimum tension for lower noise and extended belt life.

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The bottom section around the crankshaft case is formed in a curve to improve rigidity against torsional forces. The result is a compact, light and extremely rigid engine block. Its lightweight cylinder head is made from aluminium alloy, topped with a magnesium diecast head cover. Other examples of weight saving are the hydraulic engine mounts with aluminium housings, the serpentine accessory belt drive system and the bracket-less accessory installation on the cylinder block.

A water-cooled, multi-plate full-flow type oil cooler is used.

To obtain precise data for accurate engine management, the Supra's engine features a hot-wire type mass air flow meter that senses how much air is being taken in at any moment. A computer monitors current wattage in a fine wire inside an air intake passage bypass. By measuring the current change the computer calculates the intake air mass with great precision.

Supra's Two Way Twin Turbo System controls two small, lightweight turbines in relation to the engine speeds to provide a flat torque curve and quick response. The turbos are cooled by an air intercooler.

At low speed, the system uses turbine 1, by closing both the exhaust and intake gas control valves. As engine speed and boost pressure increase, the system opens an exhaust bypass valve so that exhaust pressure causes turbine 2 to run up.

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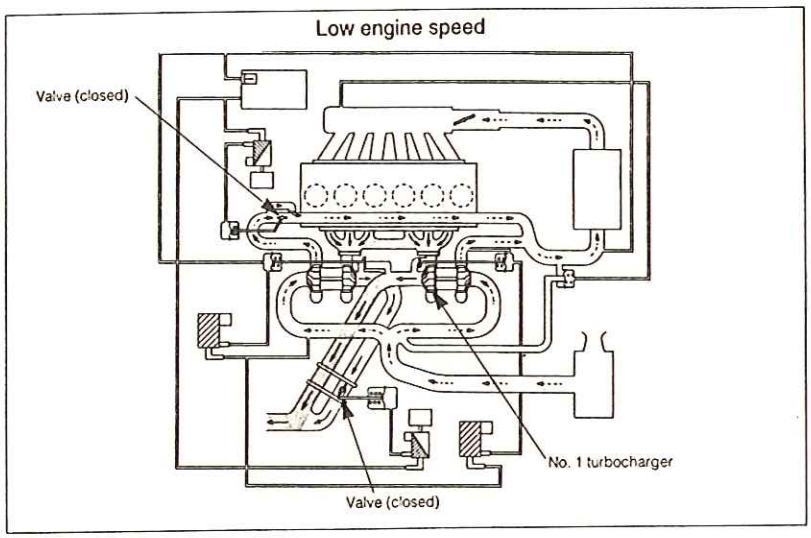
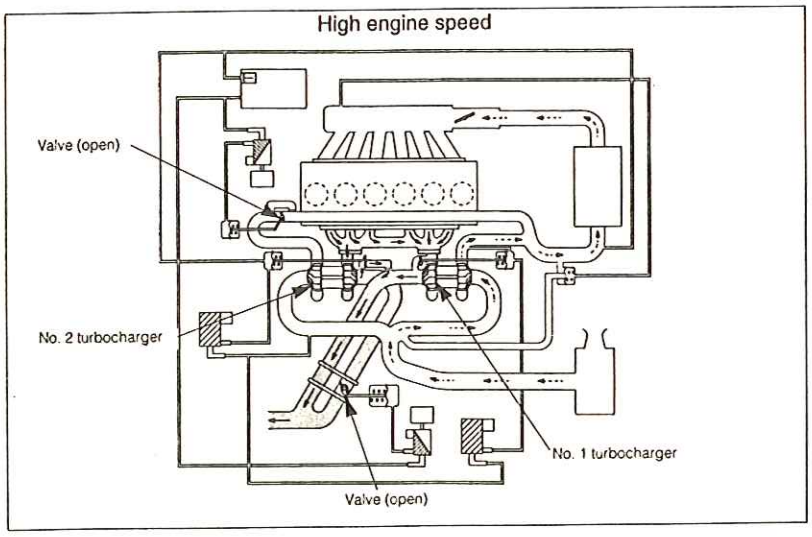
When turbine 2 is ready, the intake and exhaust gas control valves open to bring both 1 and 2 turbines into full operation. This intermediate stage ensures constant boost and power throughout the rpm range.

The air inlet projecting from the bonnet directs cooling air through the intercooler to increase air density and helps to increase power.





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System outline

Low engine speed: Only one turbocharger operates, in order to effectively use the small amount of exhaust energy available, thus improving torque and response.

High engine speed: Two turbochargers operate to provide a high boost pressure. When the boost pressure rises to a predetermined level, the other turbocharger comes up to an idle, in order to smooth the shift from one turbocharger to both turbochargers.

MANUAL TRANSMISSION

The Supra has a six speed, cross ratio manual transmission developed jointly by Toyota and Getrag of Germany. It is built in Germany and sent to the Motomachi assembly line in Japan. The transmission and clutch housings are of die-cast aluminium. The gear change pattern is conventional with reverse as the dog leg.

One can weave from one gear to the next while maintaining engine speed in the most usable power range. Running up or down through the gearbox, a close matching of engine revs, vehicle speed and gear ratios can be experienced.

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The very short gear movement ensures the shifting hand is off the wheel for the least possible time, so more time is spent focused on the road. More gears mean maximum utilisation of the engine performance. For smooth changes, the transmission has triple-cone synchromesh on first and second, double-cone synchromesh on third and fourth and a single cone on fifth and sixth. The sixth gear is an overdrive that lowers fuel consumption and engine noise during sustained high-speed driving.

The clutch pedal is made from aluminium. It has a turn-over mechanism which reduces pedal effort at the primary stage. The shift lever drops crisply into first with a flick of the wrist. The throttle valve does not open in linear proportion to the pedal, but gradually, because the engine is so powerful. When exerting more pressure on the accelerator, the throttle valve opening angle increases progressively, contributing to better throttle control in relation to the engine performance characteristics.

AUTOMATIC TRANSMISSION

The four speed ECTiS (Electronic Controlled Transmission Intelligent Sports) combines enhanced driver control and efficiency with the pleasure of complete vehicle control.

It offers two shift patterns - manual and normal - which can be selected at a touch of a switch. If the transmission can

more...

shift quicker than the driver, automatic transmission will override. In manual mode, the automatic is designed with high-torque capability, making shifts almost twice as fast. The torque-control system response time is shortened for a better sense of control. One can shift up from the low range through second range, over third to drive range. Should the driver start from second or third with the pedal depressed beyond the full-throttle position, a kick down switch momentarily drops the transmission into first.

To help prevent wheels from spinning on snow or slippery roads, gear shifting, when in manual mode D range, starts from second gear.

The electronic synthesis control system of the engine and the transmission automatically adjusts shift timing, lock-up timing, hydraulic pressure for the clutch and brake, and engine torque during shifting to achieve an almost seamless shift feeling. Like the transmission in the Lexus LS400, it automatically compensates for any mechanical wear.

LIMITED SLIP DIFFERENTIAL

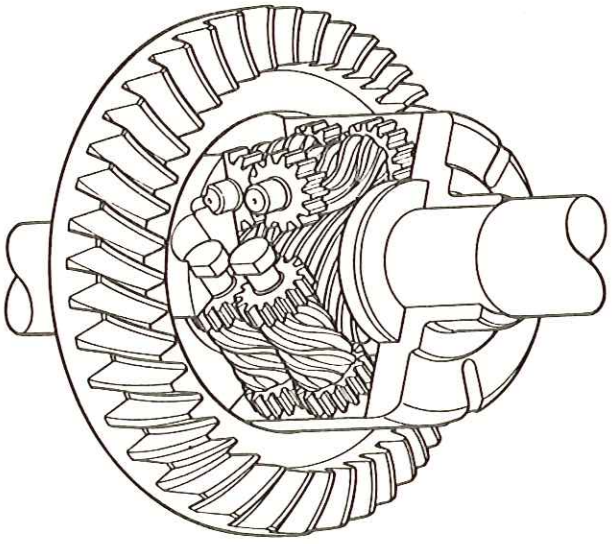
At the final stages of the powertrain, a torque sensing (Torsen) limited slip differential gear divides engine power between the two rear wheels. The Supra's engineers used this system because of its simplicity. Instead of a clutch or hydraulic aid, it uses a set of six worm and two side gears

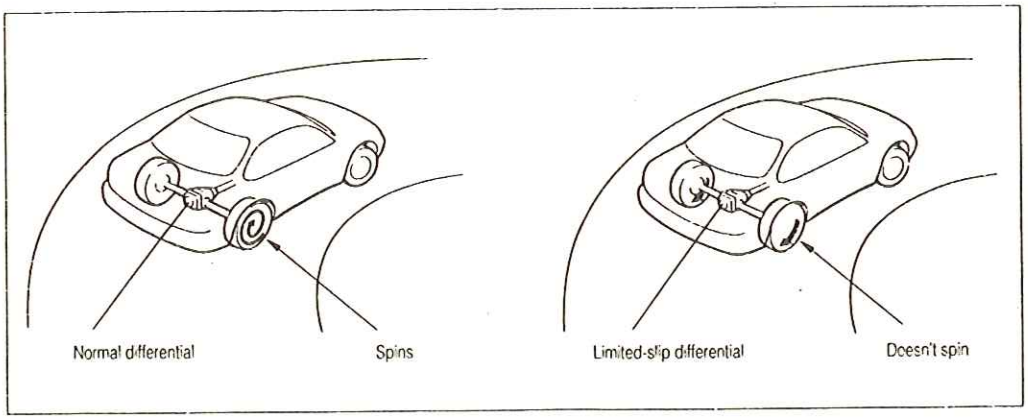
more...

which physically sense any rotational difference in each wheel, to split torque and control wheel spin. More precise and faster in its reactions than other limited slip differentials, it gives quicker, more complete control.

The Torsen limited slip differential also helps control vehicle traction. During hard cornering, the thrusting force created between three pairs of worm gears, two side gears and thrust washers limits wheel spin and ensures a steady flow of power to both wheels.

A differential oil cooler has been adopted, to maintain appropriate differential oil temperature during high speed driving.





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TRACTION CONTROL

The brakes work in tandem with the standard traction control (TRC). It provides precise electronic control of power output, minimising wheel spin and maximising traction. When TRC detects wheel spin, it reacts by applying rear wheel brakes and by controlling a sub-throttle valve and the ignition timing. Output is temporarily reduced to that wheel, until traction is regained. TRC can be disengaged by a switch on the instrument panel.

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CHASSIS AND HANDLING

The aim was to create the simplest possible mechanism, giving linear handling characteristics to the driver's input, guaranteeing stability during braking and cornering.

STEERING

The speed-sensing proportional power rack-and-pinion steering provides taut control. The power assistance increases as speed decreases, for easy operation during low-speed and parking manoeuvres. Hydraulic reaction type electronically controlled PPS (Progressive Power Steering) is standard. PPS controls hydraulic pressure acting on the hydraulic reaction chamber, changing the power steering characteristics according to the vehicle speed.

SUSPENSION

Supra's Chief Engineer opted for a double wishbone suspension design. The double wishbone suspension, on all four wheels, keeps the maximum tyre footprint on the road, making the most of the larger wheels and tyres. This system minimises changes in track and camber during cornering and when driving over bumps. It permits a lower wing height because of its compact design. The result is outstanding directional stability at high speed, and during cornering and braking. The anti-dive, anti-squat and very flat geometry gives a very low unsprung weight and very stable and natural handling without resorting to additional (weighty) devices.

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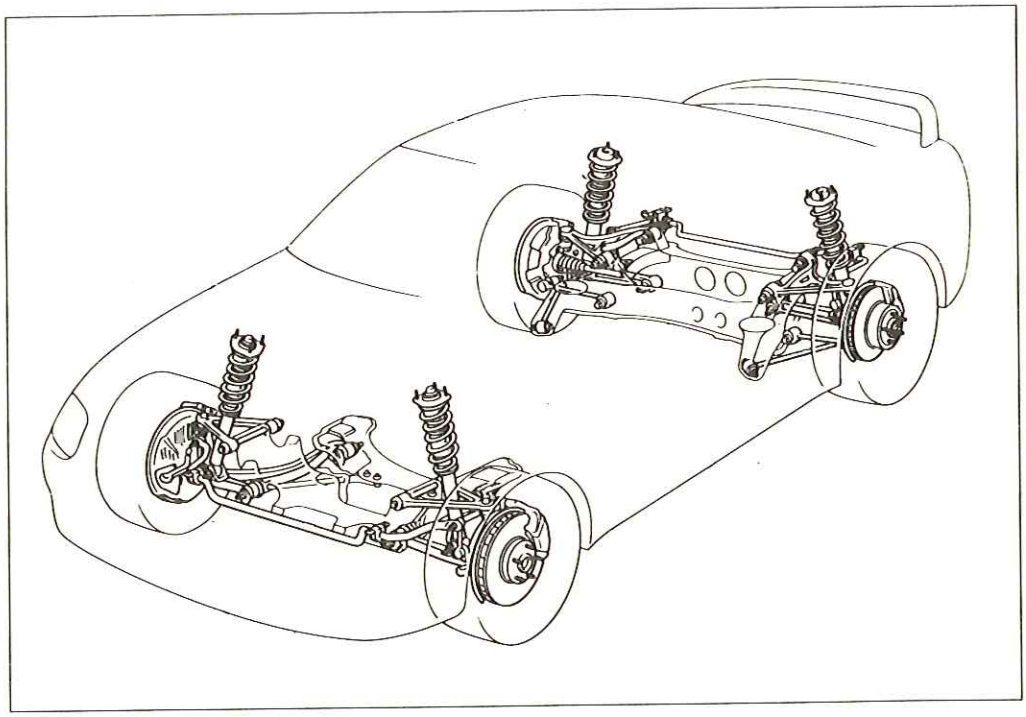
Optimal suspension geometry and wheel alignment were achieved through analysis of component design, material and characteristics.

The front wheel caster angle is small, for quick steering manoeuvres. The caster trail was set at the optimum distance to enhance straight line stability. The small king-pin off-set reduces rotatory moment around the king pin axis for improved stability when braking. In the rear, the wheels have a negative camber angle. This helps retain tyre-to-road contact when the car is exposed to lateral forces, especially during cornering. When decelerating, longitudinal force on the tyres pulls them backwards. This input force acts on the diagonal link of the suspension arms and radius rod, resulting in a compliance steer effect that gives the tyres a tight toe-in angle, ensuring the car remains stable.



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The redesigned chassis holds the road with new coil-over shock absorbers with hollowed front and rear anti-roll bars for high rigidity with reduced unsprung weight.

The upper wishbones and the front cross member are light alloy, meaning they are lighter and stiffer.

The centre of gravity has been lowered to decrease the amount of body roll. In synergy with Supra's new body design and revised suspension, this realises an improvement of the front anti-dive ratio from 20% to 40% during severe braking. The rear anti-lift ratio was improved to 70%.

During spirited cornering, a car's centre of gravity moves up and down. The amount of fluctuation depends on the suspension system geometry, the height of the roll centre and the rate of travel of the roll centre at any point in time. These parameters have a mutual effect on each other. Raising the roll centre height gives a smaller rate of travel as a result. Vehicle stability and behaviour is adversely affected because a higher centre of gravity causes the inner wheel to lift while cornering or changing lanes. Supra's new anti-rolling suspension geometry spontaneously controls the centre of gravity so it doesn't move upward. Together with a slightly negative-set rear wheel alignment, it helps to stabilise Supra's behaviour when cornering.

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BRAKES

To ensure that the Supra stops with precise control and speed, large disc brakes are fitted on all four wheels. The front brakes have 323 mm diameter discs. The four piston callipers on the front and two piston callipers at the rear ensure precise control. The 8" + 9" tandem brake master boosters help to reduce and stabilise the pressure needed to activate the brakes. Attention to aerodynamic detail can be seen inside the brake system. In a conventional brake with straight vents, when the disc spins faster, the air becomes turbulent as it passes between the fins at the front. The spiral shaped fins of the Supra's discs add cooling area and minimise air turbulence, for improved heat dissipation. This is a Toyota first.

To determine the best possible combination, the brakes were tested in a variety of extreme conditions for reliable braking performance.

The improved braking performance is due to a combination of increased anti-dive and anti-lift in the suspension and a four-wheel, four-sensor, lateral G-sensing ABS, which can modulate the brakes independently, thus allowing for better compensation between the different speed and load conditions at the inner and outer wheels both front and rear during cornering. The Supra 4-channel G-sensor ABS is also a first for Toyota.

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Speed sensors at the wheels monitor the difference in speed that may indicate impending wheel lock-up. A skidding wheel cannot be stopped, so ABS provides control during hard braking.

TYRES AND WHEELS

The tyres, tuned to the Supra's chassis and suspension, are formulated for improved road adhesion and for extended high-speed operation, with tread patterned for minimal tyre noise and harshness.

At front and rear, tyre size is respectively 235/45R17 and 255/40R17 (Michelin Pilots). The aluminium wheels are 17 x 8JJ (front) and 17 x 19.5 JJ (rear).

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SAFETY

Toyota took two approaches: prevention and protection to ensure safety. A number of specific safety features have been adopted in consideration of the high engine performance and high speed driving capability.

Supra is a functional car, powerful and driver orientated, with high grade controllability. Supra has been designed with impact protection, accident avoidance and personal security in mind - from the bumpers, to its body and engine and even the layout of the controls and gauges.

PASSIVE SAFETY

Supra's passive safety starts with the bumpers: this first line of defence includes a sponge-like material, supported by a steel backing beam on impact-absorbing mounts. Hooks hold the bonnet securely in place during a collision preventing windscreen penetration.

In a moderate collision, primary crash protection is provided by three-point seatbelts. In the event of a more severe frontal collision, the steering column is designed to deform to help cushion the driver from the full force of impact.

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Also, both driver and front passenger Supplemental Restraint System (SRS) airbags are activated, inflating in milliseconds with nitrogen gas to cushion the driver's and passenger's head and upper body area. The airbag then deflates within a few tenths of a second to restore visibility to the driver. The electronic airbags will deploy only when one of the three sensors (two in the front and one in the floor) and a fail-safe sensor together send a signal to inflate to the main computer, located at the centre of the vehicle. Gold plated terminals are used in this system for excellent conductivity and resistance to corrosion.

To absorb and dissipate energy during a collision, the crumple zones in the wing structures, bonnet, frame and other components collapse gradually. Crumple zones are pre-stressed body components that are designed to fold like an accordion, thus absorbing the energy of impact.

Then, a rigid cell encompasses the passenger compartment, complete with side impact beams in both doors and reinforced roof pillars. The construction of the cabin structure dissipates the impact of the collision all over the body frame. This body structure is named CIAS (Crash Impact Absorbing Structure).

Other passive measures include the steel seat frames, designed to absorb energy in impacts and the safety glass (laminated windscreen).

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ACTIVE SAFETY

Active safety features include the following:

- four-wheel double wishbone suspension ensures safe handling and stability even at high speed.

- traction control (TRC) controls engine torque and braking, to prevent loss of traction.

- torque-sensing limited slip differential system.

- vehicle speed-sensing, progressive power rack-and-pinion steering.

- power-assisted four-wheel ventilated disc brakes.

- four piston front/twin-piston rear brake callipers.

- four-sensor, four-channel lateral G-sensing anti lock braking system (ABS).

- six speed manual transmission with safety mechanism preventing reverse mis-shifting.

- front and rear spoilers to improve high-speed stability.

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❑ projector halogen headlamps which are among the brightest in the world, for safer high speed night driving. Each of the flush fitting units has a projector white beam fog lamp and a low and high beam headlamp. Unlike sealed beam headlamps, which require the entire headlamp assembly to be replaced, these headlamps require only that the halogen bulb is replaced. They are made of composite plastic, for less weight and greater impact resistance.

❑ a master warning lamp in the tachometer lights up when one of the nine warning lamps comes on. The lamps indicate any problems with major mechanical functions, as well as monitoring open doors and battery charging.

❑ switches are classified according to their function and frequency of use and divided into two pods on each side of the instrument panel. The reach from the driver's shoulders to each of them is set at about 700 mm, the length of the arc of a driver's effortlessly extended arms.

❑ aerodynamic front wiper blade, reducing wiper lift and effectively sweeping the windscreen, even at high speeds.

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INTERIOR

THE COCKPIT

The instrument panel flows smoothly into the door trim for a dynamic feel, featuring easy to see meters and easy to operate controls.- very important when driving at high speed. Each switch has been carefully repositioned so it tilts towards the driver while reach distance has been significantly decreased. The meter cluster was designed for optimum visibility. The emphasis was on a sports style, with the tachometer located in the centre of the meter layout. All warning lights have been located in a high position directly next to the meters, with a master warning light located in the centre of the tachometer. When one of nine warning lamps comes on, the master warning lamp also comes on.

The outside temperature is incorporated with the clock. A manual switch can change from time indication to outside temperature indication. The odometer is electronic and tamper proof with mileage details memorised for five years.

The easy-to-operate transmission shift lever is a stubby, sporty design with a short throw. For instance from neutral to first gear requires less than 5 cm of movement. To shift from second to third takes just 3 cm lateral travel. The shift lever has been brought 31.5 mm closer to the driver's hand compared with the previous Supra model.

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The diameter of the steering wheel is 370 mm. A cross section reveals that the fit in the hands is a result of its ellipsoid shape. A tilt mechanism allows over 11 degrees of adjustment through five steps. The steering shaft angle has been reduced by 4.4 degrees to 17 degrees to improve the driving position.

The Supra cruise control allows you to set the vehicle at a desired speed over 25 mph with the foot off the accelerator pedal. If vehicle speed falls below 25 mph, or more than 10 mph below the preset speed, it will automatically cancel out. The preset speed can also be cancelled by pulling the control lever in the "CANCEL" direction, by depressing the clutch or brake pedal, or by placing the selector in "N" (auto).

THE SEATS

The new Supra seats were developed to fit and firmly hold the driver in place with a flowing, curvaceous style. The seat design is simple and holds the occupant properly and in comfort with a minimum of (weight adding) extra adjustment devices. As T. Sato, in charge of the Supra's interior design, states: "At the high speed that the Supra can be driven, seat holding performance must be outstanding to counter the effects of lateral Gs."

The hip point has been lowered by 17 mm, creating a lower, sportier driving position.

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Soft moulded padding provides a gentler fitting. Under the layer of padding, urethane chips rim the seat cushion edge to give firm support in critical areas.

A power driver's seat is standard equipment (manual for passenger seat). Seats and armrests are trimmed in leather as standard.

The Supra has a two plus two seating configuration with the rear seats easily folding forward for extra luggage space.

THE AUDIO SYSTEM

The audio system has high-mount door speakers for better sound effects. A powerful and high quality sound is achieved by means of optimum layout of the six speakers. The system features an electronic tune, RDS/EON radio and cassette deck.

CLIMATE CONTROL

Improvements are:

- approximately 10% in heating and cooling capacities
- stepless blower speed control in an automatic mode for precise temperature control
- a new coolant R134a, that does not contain ozone-damaging freon
- a new evaporator that prevents odorous mould from growing

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The new Supra has a cooling capacity of 4,300 kcal/h and a volume of 460 cu m/h. The heater system has a capacity of 4,100 kcal/h and a flow volume of 320 cu m/h.

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For further information, contact Simon Small, Press Office, Tel: 0737 768585.

Supra

Press Information

FOR IMMEDIATE RELEASE

August, 1993

THE NEW TOYOTA SUPRA

RESEARCH, DEVELOPMENT AND PRODUCTION

Supra's development story began in February 1989, and lasted 42 months, under Chief Engineer Isao Tsuzuki. The designers, engineers and planners worked together with the DP team (Designated Panellists).

This team rapidly became known internally as the Top Gun team. The top three Toyota test drivers tested the Supra at designated stages in its development, forming a close link with the performance-related engineers for chassis, engine and brakes. Prototypes were also driven and evaluated by professional racing drivers. The full project team comprised 20 people.

The Supra underwent testing of steering characteristics and brake performance on public roads and highways in Germany (including the Nürburgring), Great Britain (Silverstone), Belgium, France, Italy and Switzerland.

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In the USA, the car was tested on highways and freeways in California, Nevada, Arizona and Michigan, and also on the circuit of Laguna Seca.

To improve its characteristics under extreme low temperatures, the car was also tested in Canada, near Toronto. On the test track at Toyota's Shibetsu test course in Hokkaido, Northern Japan, Supra underwent extensive brake application tests under extreme winter conditions. Also, in Japan, the Yamaha and Tsukuba circuits were used for high speed tests.

For 30 months, the team drove the fastest available competitive cars on the fastest tracks, comparing them with prototypes of the new Supra.

From the beginning of 1989 until the beginning of 1993, critical test data and driver feedback from years of testing were converted into specific technical terminology, determining the final suspension geometry and wheel alignment settings, the optimum combination of spring rate and damping force and the best materials for bushes and brake pads.

Testing of main components such as suspension, engine and transmission began in 1990 under the skin of the previous model. The first prototype was ready in the early summer of 1991.

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Isao Tsuzuki says: "Conventional wisdom has been that the better the performance, the worse the fuel economy and the more noise, vibration and harshness. We knew we had to turn these negatives into positives. Less has to be more, much more." His vision of the sports car of the future includes ultra lightweight, ease of use, with a long life cycle and a strong focus on the essentials for a top performance sports car. Even though our expectations of what a sports car should be are changing, the desire to enjoy the intense driving pleasure has not.

The new Supra enjoyed the invaluable advantage of Toyota's latest technology, the result of consistent dedication to research and development. R&D helped determine the materials used in every component of the frame, chassis, body and engine. Intensive study of the fuel combustion process created a vast database. This guided the design of a more efficient engine that utilises advanced sensor technology and a precision-calibrated management computer in the multi-valve engine format pioneered by Toyota.

THE "WILLPOWER" PROJECT

Another example of the determination of the development team is the "willpower project". From the outset, the team strove to reduce excess weight from the design, creating a natural, responsive and spirited performer by using simple mechanics for basic functions. Parts became slimmer, simpler, smaller and even structurally different.

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Sophisticated computer management techniques were applied to ensure the most efficient use of performance potential. Careful attention was paid to fuel economy and the environment.

Plastic and resin parts are marked for easy recycling, in accordance with the existing international standards. The team didn't hesitate to add safety equipment, including state-of-the-art electronic airbags and ABS as standard.

This meticulous commitment to weight-saving resulted in a kerb weight of less than 1,600 kg.

ISAO TSUZUKI: CHIEF ENGINEER - SUPRA

March 1969: graduated from Nagoya University with a Masters in Mechanical Engineering.
April 1969: joined Toyota Motor Company (TMC).
April 1969 to January 1975: worked as a powertrain designer on manual transmission for Celica and other models.
February 1975 to January 1980: was transferred to the Product Planning Division, in charge of Corona.
February 1980 to January 1983: was transferred back to Power Train Division in charge of manual transmissions and clutches.
September 1983 to January 1989: was transferred back to Product Planning Division, in charge of first generation and current MR2 (including super-charged version).
February 1989: was promoted to chief engineer of Supra.

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PRODUCTION OF THE NEW SUPRA

The previous Supra model was produced at the Tahara plant but production of the latest car has been switched to Motomachi in Toyota City. Production started in May, 1993. Motomachi, is, in fact, one of Toyota's oldest plants and was the first fully integrated Japanese car plant when it was completed in 1959. It has, of course, been extensively modernised over the years with about 5,200 people now employed there building several other models in addition to Supra.

Roughly 2,000 of the new Supra will be produced each month with about 1,000 units being retained for the Japanese domestic market, 700 going to the US, 100-150 for Europe and 150-200 for other markets. Total production will therefore be around 24,000 per year.

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For further information, contact Simon Small, Press Office, Tel: 0737 768585.

Supra
Press Information

FOR IMMEDIATE RELEASE

August, 1993

SELLING AND SERVICING THE SUPRA

With only about 250 units being available in the UK in a full year, the new Toyota Supra will be a very exclusive sports car. The Toyota network now runs to 265 dealerships and of these, 69 also hold the Lexus franchise. Clearly, the Supra volume is insufficient to allow the marketing of the car through all Toyota dealerships and so, only 25 dealers will sell the new Supra.

All 25 are existing outlets for both Toyota and Lexus, chosen on the basis of their geographical position and the potential of their local markets, their experience with the previous Supra and with Lexus, the quality of their staff and their adherence to the highest standards. Each Supra dealer will operate at least one demonstrator and will work on a margin of 10%.

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The 25 Supra dealers are :

Bryan Bros., Bristol

Marshall Rolfe, Southampton

Evans Halshaw, Brighton

Octagon, Bracknell

Lookers, Norwich

Sturgess, Leicester

Lindop Bros., Queensferry

RRG Salford Quays, Manchester

Hartwell, Leeds

Neville Johnston, Belfast

Hylton of Wolverhampton

Cooper Park Lane, London

John Roe, Grimsby

Pinewood, Streatham Place, South London

Lex North, Glasgow

West Park, Southend

Mann Egerton, Derby

Skipper of Plymouth

Motorworld, Oxford

Monty's of Sheffield

Evan Williams, Cardiff

Northway, Liverpool

Jemca, Hendon

Weir, Edinburgh

Dutton Forshaw, Newcastle

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Servicing

All Lexus dealers will be fully trained to service the new Supra, so, at the present time, there are 25 sales outlets and 69 service dealers. Parts will be supplied on the same basis as for Lexus, that is, daily from Toyota's Parts Distribution Centre in Lutterworth.

Like all Toyotas and the Lexus LS400, the new Supra carries a three year or 60,000 mile manufacturer's warranty. It will also come with free membership of Club Toyota and the RAC for one year.

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BACKGROUND - The Supra Story

The new Supra is of course, a completely new car. It is even quite different to the previous turbocharged car of the same name although it retains the front engine, rear wheel drive and 2+2 configuration. Prior to the introduction of what might be called the first generation Supra in 1986, Supra models were derived from Celicas with the first Celica Supra (or XX) appearing in 1978. But the real history of the Supra goes back further than that.

The Toyota tradition of high powered sports cars goes back 25 years to the Toyota 2000GT in 1967 - the first genuine Japanese sports car and Toyota's first 'grand tourer'. Only 335 were built. It was powered by an in-line six cylinder engine with double overhead camshafts and triple carburettors. The 2000GT had a five speed synchromesh gearbox, four wheel disc brakes and magnesium alloy wheels. It also had front and rear double wishbone suspension. Twenty six years on, the new Supra continues the traditions of innovative, advanced engineering - although the technology has progressed somewhat.

The 1978 Celica Supra evolved from the second generation Celica model. It was given a longer nose, aerodynamic liftback styling, rectangular headlights and a T-shaped grille. There was a choice of two fuel injected six cylinder engines of 1988cc and 2563cc - both considerably more powerful than the four cylinder units fitted to the tamer Celicas. Exports of the Celica Supra from Japan started in 1979 with the 2.6 litre, 110hp SOHC six cylinder engine.

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In July 1981, the third generation Celica was introduced followed in August, 1982 by a new Celica Supra. It featured more aggressive styling (Cd 0.35) and more power than its Celica ST/XT stablemates. Flared wheel arches and wide low profile Pirelli P6 tyres on attractive dished alloy wheels were added in 1983. Engines were the LASRE 1S and 1G (Lightweight Advanced Super Response Engine) which were fuel efficient, compact and with high power and quick response. The 1S, a four cylinder 1823cc OHC unit, had the world's first electronic air-fuel mix control system. The 1G was a six cylinder 1988cc engine.

By now, all Celica engines (six were available) were twin cam units and overdrive was fitted to all auto transmission models, a development pioneered by Toyota. The Celica Supra even offered the extra performance and efficiency of a two-way overdrive. As a foretaste of things to come, the 2800GT Celica Supra had 'Navicom' as an option (in Japan). This micro computer controlled electronic compass displayed graphically direction and distance to a precoded destination. Navicom was the first of its kind and the precursor of the satellite navigation systems and road mapping devices that are becoming increasingly popular now.

February 1982 saw the introduction of a turbocharger in the Celica Supra. This M-TEU (6 cylinder, 1988cc) engine used a knock control system with two sensors to optimise ignition

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timing. It also had a unique Toyota system of air intake swirl ports to give 145 ps at 5,600rpm and 21.5 kgm at 3,000rpm. Later that year the 2.0 GT Celica Supra made its entry with a twin cam six cylinder 24 valve engine rated at 160 hp at 6,400 rpm which made it the most powerful Japanese engine in its class. It gained the prestigious *Motor Trend* Import Car of the Year Award, just as an earlier Celica had in 1976.

In 1985 the Celica switched to front wheel drive and this signalled the separation of the two names with the first purpose built Supra debuting in Japan in February, 1986 and in Britain in July. The new Toyota Supra combined head-turning good looks with a high performance and specification. Throughout its life in the UK, it was also recognised as being excellent value for money. Retaining rear wheel drive, the Supra used the newly developed three litre 7M-GT six cylinder engine with 201 bhp.

The Supra's level of performance was unmatched by any production car in Toyota's history with double wishbone suspension, all-round discs, a limited slip differential, ABS and a specification including air conditioning, cruise control and, in other markets, a detachable 'targa' roof and TEMS (Toyota Electronically Modulated Supension). Minor changes in 1988 included body modifications and improved brakes. In Japan and the USA, a turbocharged (7M-GTEU) version was available with 232bhp. This was introduced in Britain at the end of 1988.

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Although not available in the UK, a 2.5 litre twin turbo engine became available in 1990 (1JZ-GTE) along with other minor improvements.

Prior to the introduction of the first Toyota Supra in 1986, Toyota (GB) had sold 4,132 Celica Supras. Since then, 11,600 Supras have been registered between mid-1986 and the end of the model's life this year.

Total production of the Supra from 1986 to the end of 1992 is 240,220 units with exports from Japan in that period totalling 149,303. Exports to Europe totalled 40,703.

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