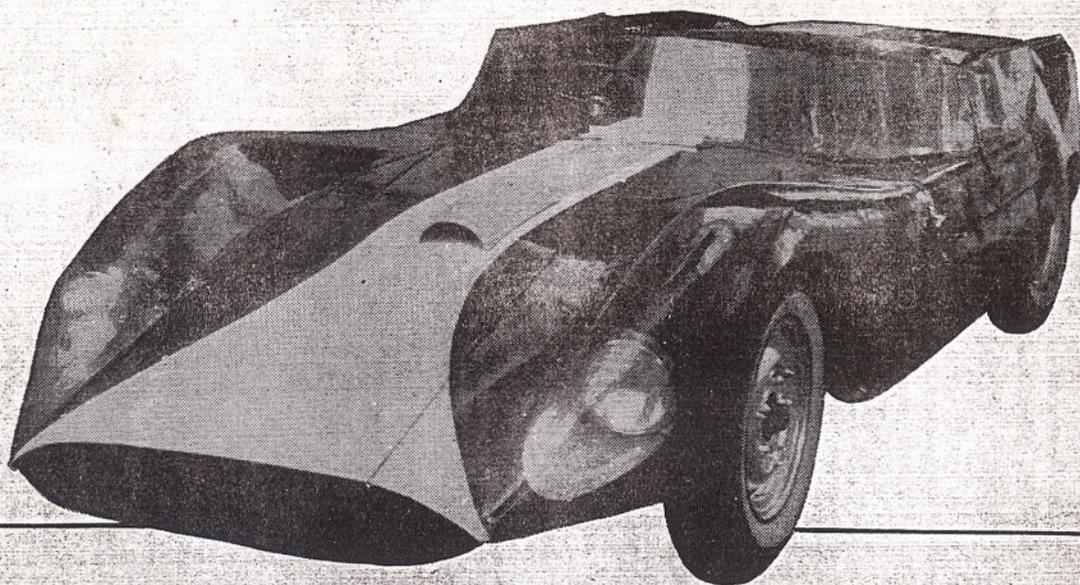


First Indian Sports Car



Congratulations, Calcutta Motor Sports Club Ltd.
on a pioneering achievement in building the first Indian
Sports Car !

We are particularly happy that the chassis, based on a
tubular frame, was fabricated from Electric Resistance Weld
Steel Tubes, made at our Jamshedpur Works.

INDIAN TUBE

THE INDIAN TUBE COMPANY (1953) LIMITED

A TATA-STEWARTS AND LLOYDS ENTERPRISE

ITC-74

THE GRAND PRIX—SATOW'S POPULAR VICTORY

Huge crowd—they were pouring in even at 11.30 a.m. So traffic jam at the gate. Many cars—each event had no less than eight starters—so much noise and grand spectacle. Mixed gathering—there were ladies and men—old and young—local and foreign—oh so colourful!

Yes, it was Grand Prix Day!

Before a record crowd that packed the stands to suffocation at Barrackpore, M. G. Satow drove his faithful 'Cheetah' to a most impressive victory. This was more creditable because the opposition included two formidable opponents in Cowper driving the redoubtable Allard and Dr. C. C. Rossi from Bombay his Alfa Romeo. Things were made more exciting as the nine highly tuned machines went off to a box start. Richards (Bijou MK IV) shot into the lead with Cowper (Allard) right on his tail, followed by Satow. Rossi, Willoughby, McEvoy and Stansfield were in close attendance while Shearer and Wells brought up the rear.

In the first 10 laps of the race it seemed a most orderly procession except that Stansfield had to retire having lost his exhaust system round Temple Bend, and Satow slowly reducing the gap between the Cheetah and the Allard. When Richards paid his first visit to



Our Bombay entrants—Rossi and the Alfa Romeo.



The winner enwreathed in smiles with the coveted Trophy.

the pits with water trouble, the Allard went into the lead closely followed by the Cheetah. Richards' machine had developed acute plumbing difficulties and his repeated visits to the pits wrote off his chances of winning this year's Grand Prix.

The first dramatic moment came on the 13th lap when coming through the chicane Cowper spun and before he could correct himself Satow jumped into the lead. With the Allard breathing down his neck and the Cheetah sounding a bit rough the crowd was expecting Satow to succumb to Cowper's determined driving at about the half way stage, but for Satow this was do or die. He began to draw away perceptibly, and at the roaring end of the race had a good four second lead over Cowper. Willoughby (Delilah) was third. Only the first three finished on the 30th lap.

Of the others McEvoy ran his poodle dry and had to retire with his engine as good as written off. Rossi was unable to make the Alfa Romeo perform as expected. Wells was having difficulty with his second gear while Shearer suffered from a lack of training and found the pace too hot.

The second race gave Sethia (Herald) an easy victory with McEvoy (Ambassador) and

CHEETAH: PROGRESS REPORT

M. G. Satow.

Building

Early in 1961, the Calcutta Motor Sports Club decided to sponsor a prototype car as a basis for "Formula" scratch racing. The design was not to be exclusive, but was to be made available to potential builders as a developed and proven design within the capacity of the average builder with access to ordinary workshop facilities.

Work on the design started around March 1961 and after two months the basic layout had been developed, general arrangement and some detailed drawings had been completed and material lists prepared.

The car's first appearance in bare chassis form was in April 1962 when it appeared for an initial test run at Barrackpore. No serious mechanical defects or design faults emerged from the first proving run, so construction of the body was started. This was sufficiently advanced for the car to appear in competition in December 1962, following which it continued to race throughout the season whilst mechanical development and completion of the body details progressed.

Between the 1962 and 1963 seasons the car was completely stripped for examination and rectification of any faults which had emerged during the 1962-63 season's racing. Most of these were corrected when the 1963-64 season opened, and the car attained 100% completion by the end of the year.

Development

Probably the most important characteristic needed to win races is reliability and a car which fails to achieve consistent reliability is unlikely to reach the finishing line, whatever other merits it may display whilst running! Therefore, the first phase of development was concentrated entirely on eliminating causes of failure or temperament in both engine and chassis.

A systematic programme was drawn up, concentrating mainly on the chassis, firstly to detect and correct any structural weakness and eliminate risk of failure and secondly to correct any deficiencies in the handling and stability of the car at speed.

Chassis

In order to concentrate on the chassis the

engine was, for the first (1962-63) season, deliberately left in a slightly detuned condition and no attempt was made to extract the maximum power of which it was considered capable. As events turned out, the engine gave far more initial trouble than the chassis and the programme had to be modified to correct several drastic engine failures; which will be discussed later.

Turning back to the chassis, the main deficiencies were surprisingly few, and consisted of:

1. The rear suspension spring rate was too low and allowed the back of the car to 'bottom' frequently on bumps.
2. The rear suspension trailing arm anchorages on the chassis were not strong enough to take the breaking and driving loads and all four welds cracked.
3. The steering box mountings were insufficiently rigid laterally and distorted.
4. The top chassis members persistently cracked where welded to the top of the front suspension frame.
5. Failure of the rear engine mounting.

These faults have now been corrected and since the start of the 1963 season, no further criticism of the chassis has emerged.

The rear spring rate has been increased by the addition of a transverse leaf spring. This at present has two full length blades which result in excellent adhesion and very stable handling on the track at Barrackpore. A further $\frac{1}{2}$ blade might be added if heavy loads are to be carried, but this would probably detract somewhat from the handling.

From the outset, the handling of the chassis has been good, and it has exhibited approximately neutral steering characteristics with equal tyre pressures front and rear. This indicated that the front and rear roll centres and stiffness were substantially correct and the transverse spring was arranged to be free at the centre so that it affected only the vertical spring rate and not the roll stiffness. This feature is convenient since it allows adjustment of one characteristic at a time.

Strengthening of the trailing arm anchorages was a straight forward operation involving stiffer and stronger brackets and the steering

Progress Report (contd.)

box mounting was stiffened by the addition of extra flanges and a transverse strut.

The cracking of the top chassis tube anchorages proved somewhat baffling but was ultimately cured by using a single bolt attachment instead of a weld. Stiffening the welding after the early failures failed to cure this ailment so when the car was stripped for examination after the 1962-63 season the tubes were cut through immediately behind the welds and the chassis was subjected to twisting artificially. This showed that the top tubes were subject to appreciable bending stress at the front in addition to the tensile and compressive loads for which they were designed and led to the adoption of the single bolt attachment which freed them from bending restraint.

The rear engine mountings of the conventional Ambassador installation are not used in Cheetah, but the weight is carried on a rubber block under the gearbox whilst location vertically and horizontally is provided by the rear mounting at the end of the gearbox extension. This was originally an Ambassador component which proved quite inadequate under racing conditions.

speeding to 16.2 m.p.h. | 1000 r.p.m. in top gear
15×5.50 | 5.90 tyres.

Clutch

Standard springs with 1/16" packing washers behind them have been found adequate to deal with full power gear changes at all speeds.

Engine

As mentioned earlier the engine gave trouble from the outset, even before attempting the maximum power considered safe under tropical conditions.

As originally run it was a normal Ambassador unit which had been carefully assembled to the requisite racing standards using Ambassador bearing shells, flat-top pistons (9:1 compression ratio) and an unmodified Ambassador cylinder head. Two H4 (1 1/2") S.U. carburettors were used, fed by two S.U. electric pumps. The engine was run on SAE 50 mineral based lubricating oil.

It was immediately apparent that bearing

Progress Report (contd.)

cylinder head has now been modified by enlarging the inlet ports, increasing the inlet and exhaust valves and seats by $\frac{1}{8}$ " and reshaping the combustion chambers.

Double valve springs have been fitted in conjunction with a modified camshaft and the engine is now consistently taken to 6,000 r.p.m. with 6,200 r.p.m. as the useful limit.

Under these conditions, the maximum water temperature indicated during the 1964 Grand Prix was 82°C. whilst the oil reached 98°C. Both these readings can be regarded as satisfactory in conjunction with an oil pressure of 50 lb./sq. in. at 98°C. and 5,000 r.p.m.

One problem arises from time to time with the B.M.C. 'B' series (Ambassador) engine when in full tune. The cylinder head gasket is prone to leak, if not actually fail. Gasket performances in Cheetah have been unpredict-

able and if trouble is to be minimised it is important that the head and block faces should be lapped together to ensure a true fit. Over tightening of the head studs will not effect a cure and there is no benefit in exceeding a torque of 45 lb. ft.

General

With the possible exception of the cylinder head gasket, it now seems that the car has achieved the standard of reliability and performance envisaged for it. Since its first appearance on 2nd December 1962 it has been entered for all the 28 events for which the author was present in India. It has failed to start in 1 (broken rear engine mounting on 15-12-63) and has failed to finish in 1 (Big end bearings, Grand Prix 1963). Of the 26 events entered and finished, 13 were Class III wins.

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MOTOR INDUSTRIES CO. LTD.,

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MANUFACTURERS OF

**MICO-LICENSE-BOSCH SPARKING PLUGS AND
DIESEL FUEL INJECTION EQUIPMENT.**

FROM OUR SIDE....

The Madras meet, to which three of our best men with their machines were sent, ended gloriously for the C.M.S.C. Dickie Richards won two trophies while Mike Satow placed second in one and third in another. Dr. Rossi who is also a member of the C.M.S.C. was also successful in his own class. It was, therefore, most unfortunate that Peter Cowper had trouble with the Allard and was not able to compete.

It is most heartening that our formula cars met with such success and that the Bijou Mk.IV proved itself to be the best car entered by winning the open scratch event. That the Cheetah came third in the same event speaks volumes for the knowledge and ability of our racing drivers to construct really high performance motor cars both for speed and for durability.

From all accounts the Madras Course is by no means an easy one and the demands on both men and machines is truly exacting. Under these conditions the credit is all the more.

Dickie Richards had gone on to Bangalore to compete there on the 1st March 1964, and the results at the time of going to press were that he had won one event there also.

* * *

DRIVE CAREFULLY AT ALL TIMES AND
PARTICULARLY WHEN COMING TO
AND RETURNING FROM
BARRACKPORE

NEW REGULATIONS

A word to all competitors. In order to preserve our good safety record, your Committee have added the following new regulations:—

If you find it necessary to visit the pits during a race, please use the entrance situated a short distance after the chicane on your right. You must therefore come out of the chicane on the inside or right-hand side of the circuit. To rejoin the race, drive along the front of the pits to the exit where the paddock marshall will signal you back on to the circuit. Remember, *cars on the circuit have right of way.*

After the race is finished *all cars must complete a further lap to enter the paddock area by the entrance described above.* The winner of the race should *leave his car in the paddock* and walk over to the presentation table for his prize.

If you arrive at the circuit during practice or while a race is in progress, you must *wait at the old paddock entrance* until the Clerk of the Course (or a track marshall posted at that point) signals to you with a *Green Flag*, indicating that you may proceed to the paddock area.

* * *

Visitors are further requested to leave their cars in the car park and avoid bringing them into the paddock unless they are competing.

Competitors are requested to bring their cars in before 11 a.m.

With the compliments
of

CASTROL LTD.

14, INDIA EXCHANGE PLACE
ALLAHABAD BANK BUILDING
CALCUTTA-1

