

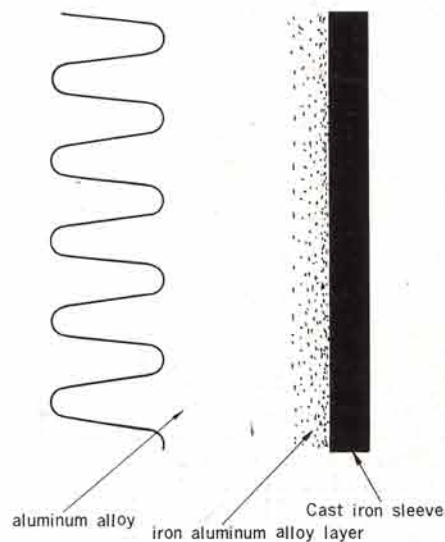
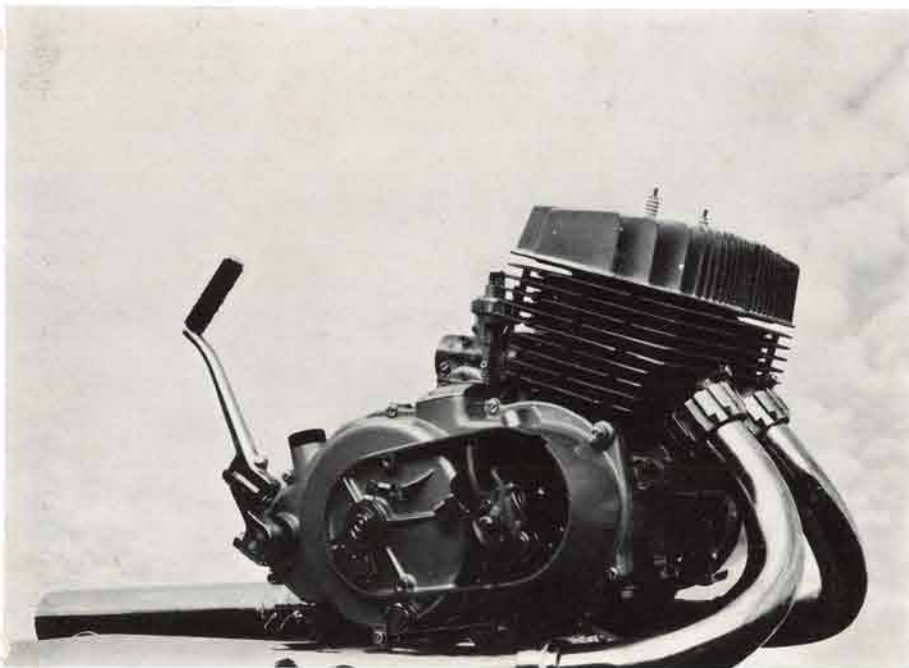


## Another advancement in motorcycle engineering: Yamaha's Metallic Bond Cylinder

How to develop a power-unit for higher performance and better reliability.....this is a pending problem on which modern motorcycle engineering has never ceased to focus major portion of efforts for solution.

At a final analysis of it, we reach a conclusion that a key to solution should lie in developing a cylinder material. More durability, better heat conductivity, and less weight are absolutely indispensable elements.

A vital component of engine should be built of such a material as satisfies these three requirements at the same time. Now, experts are unanimous to admit aluminium-alloy excellent from the points of weight and heat-conductivity. Compared with steel, it weighs only one-third in specific gravity, while it increases heat-conductivity by three times. If used as it is, however, aluminium-alloy is found rather fragile at its part exposed to incessant friction. Several measures are taken to make up for this shortcoming.



YR-1 is Yamaha's typical model on which metallic bond cylinder engine is mounted.

### 1. Hard chrome plating over friction surface

Heat-conductivity is proven highest with this method. But it is extremely expensive and not assured of any satisfactory durability (Boring is not possible with this type of cylinder). Therefore, it can be applied only to racing cylinders.

### 2. Cast-iron sleeve fixed into aluminium-alloy barrel

This method is to press cast-iron sleeve into aluminium-alloy barrel with thermic treatment. It has been so far applied to most of cylinders, but never perfect. The higher a working temperature gets, the larger a gap becomes between them to make heat-conductivity poorer. Gasoline, oil, and exhaust gas flowing into this gap have the worst effect upon heat dissipating function. Piston seizure is a final result.

The sleeve may be more tightly fixed by means of higher thermic treatment to correct this fault to some degree, but in this case, the sleeve or aluminium-alloy barrel itself is so often cracked in a cold season or when heating and cooling are incessantly repeated.

### 3. Cast-iron sleeve wrapped with aluminium-alloy

The sleeve is wrapped with aluminium-alloy by means of simple casting. This method is subject to almost same damages as stated in item 2.

### 4. Metallographical one-unit casting

This method is to cast two different kinds of material into one unit metallographically through a medium of special metallic bond. The advantages of it would be self-evident, if it could be put into practical use.

### How it is accomplished

So far attempts have been made by other manufacturers to turn this method into practical use. But none of them has been successful, they have come to a deadlock with a fatal barrier, but Yamaha has done it. Now, let's probe into the processes to be worked out.

1. Cast-iron sleeve is dipped into aluminium-alloy solute where iron and aluminium combine with each other to form some iron-aluminium alloy layer.
2. Aluminium-alloy is wholly fused into one-unit with aluminium membrane which is formed

on the surface of sleeve, as soon as it is pulled up out of solute.

3. Aluminium-alloy and cast-iron are cast completely into one-unit through a medium of iron-aluminium alloy layer which is called metallic bond.

Item 2 is a vital part of this method. Alumina formed on the surface of sleeve at the time of pulling up has been a serious impediment to further step. For it has an extremely high melting-point, and has never been fused into one-unit with aluminium-alloy melting at lower temperature.

Yamaha has completely eliminated this long pending fault. Yamaha has achieved a full success in turning-out this unique metallic bond cylinder which is made of materials completely unified at the fusing joint.

It is proven keeping heat-conductivity in the most ideal condition, while it is as durable as ordinary cast-iron ones at its friction surface, and less in weight by 50%. Piston clearance is reduced by 30%, which makes compression ratio much higher.

Metallic bond cylinder is Yamaha's fresh accomplishment in the field of motorcycle engineering.



Charlie Young (Pty) Ltd.,  
sole distributors of  
Yamaha motorcycles in  
the Republic are proud to  
announce that

**MR. JIM REDMAN**  
M.B.E., 6 times World Motor-  
cycle Champion, has joined the  
organisation as a Director.

Mr. Redman will be based in Durban and will be  
happy to put his experience at the disposal of all  
Yamaha owners and Yamaha Dealers throughout  
the Republic.



**YAMAHA**  
way up front in  
motorcycle engineering

CHARLIE YOUNG (PTY) LTD. 69 PINE STREET DURBAN TEL. 61

**JIM REDMAN, AN EX-HONDA ACE HAS SWITCHED TO YAMAHA!** But never jump at a hasty conclusion. This six-time title winner retired from the international sports circles last year. He has joined Yamaha not for racing but for business, taking up his appointment as a sales director of Charlie Young (PTY) Ltd. in Durban, South Africa.



Miss Eiko Wakabayashi is a heroin in the 5th work of James Bond series entitled "In You Only Live Twice" to be released shortly. But Toyota 2000GT specially equipped with a radar plays another her oic part for justice as a Bond car in it. 2000GT owes its fascinating performance to Yamaha!

1955 THE HISTORY OF YAMAHA 1967

## TWELVE YEARS WITH YAMAHA

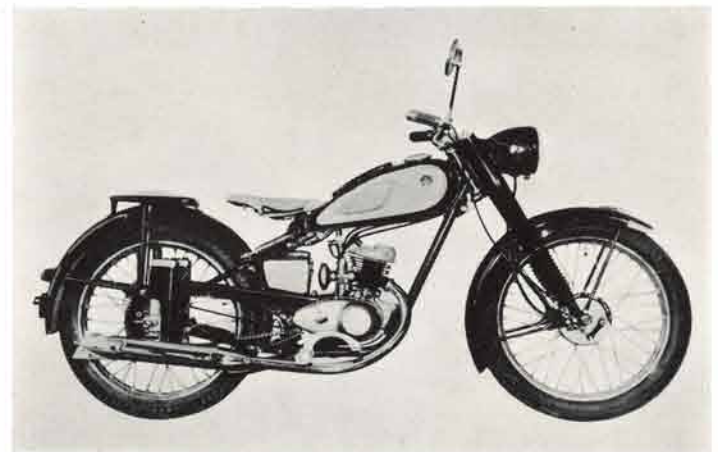
### The cradle

In 1955 the Japanese motorcycle industry was in a state of unprecedented boom and the market was flooded with a dizzy number of different makes released by as many as one hundred manufacturers. But, what were Japanese bikes like in those days? In a word, they were far from satisfaction. Just make an image of them from the following conversations.

"How to start a bike-engine?" "First, give a few warming-up kicks to a pedal, and then kick it with your full strength." "Does it start, then, really?" "Yes, if luck would turn to your favor!" As a matter of fact, starting was a kind of toil even for an adult rider. At most of cases a bike remained obstinately motionless with his fullest efforts. If luck would turn much worse, an uncontrollable pedal reaction from mis-explosion made him tumble with a sprain or fracture suffered on a leg. What a damnable machine it was in those days! It was just then that Nippon Gakki Company launched onto the market with its first production model, 125 cc YA-1 marked with triple tuning forks well known



New Yamaha's, scored another (No. 19, No. 20, & No. 21) win in Asama Race which was a mecca of speed fans in those days. (1955)



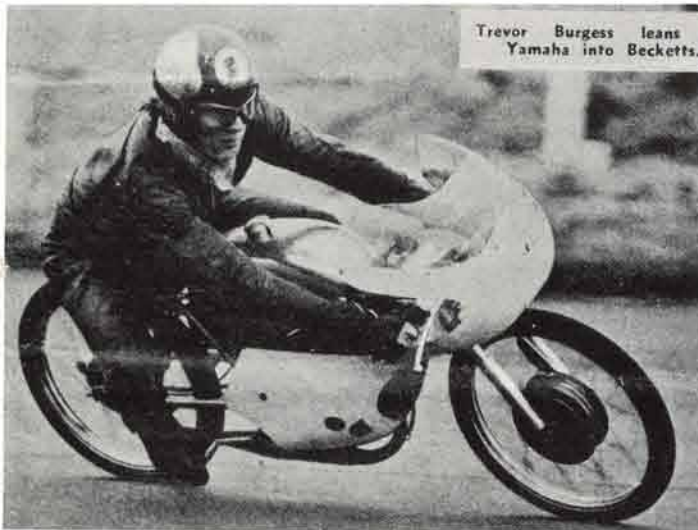
YA-1, Yamaha's first model was quite revolutionary in many respects. (1955)

to the world as a symbol of Yamaha musical instruments. This newcomer completely broke down the image of motorcycle. For it was always ready to get alive into motion with one easy kick. Starting was no longer a troublesome task but a childish action. Some salesmen even demonstrated its outstanding handiness by pushing down a kick pedal with single hand to start an engine. Another novelty was its outlook. YA-1 was finished in sparkling reddish brown with elegant white trim. It was strikingly attractive among other makes in monotonous black. But, sensation came atop when new Yamaha exhibited unmatched performance to capture a win in Mt. Fuji Climbing Race which was one of the biggest events in those days. Racing success combined directly with sales advantages to survive the hottest contest in the market. Therefore, each manufacturer used to give a full support to the major events with its factory team. In the 1955 Fuji event, a race-novice Yamaha was proven more reliable and faster than any other make.

No wonder Yamaha's brilliant success extremely stirred the interest of enthusiasts all over Japan. Yamaha was assured of its promising future as a motorcycle maker just with this revolutionary model. Now, you may well ask a question "why did a piano maker advance into the two-wheeler market so successfully?" Yes, that was a mystery in Japan twelve years ago. (Continued)

# YAMAHA'S Topics

CONTRIBUTION WANTED. News, photographs, and any bit of correspondence on YAMAHA in your district would be most welcome for this journal.



Trevor Burgess leans Yamaha into Becketts.

THE 50 cc YAMAHA 8-SPEEDER ridden by Trevor Burgess has made a conspicuous mark in its class of British big events since last summer. This tiny special is built of a homemade frame, and mounted with a 1964 YF-1 engine which is fitted with a devised watercooling system. The original 4-speed gearbox plus Gomatic 2-speed back axle give 8 ratios virtually. Top speed is claimed to be higher than 95 mph. It is the only machine to have beaten George Ashton's Honda at the event of Darley Moor, his home ground.

She is a mascot girl of Yamaha team.



Pictured here is a line-up of Yamaha baseball team, which is formed by Distribuidores Venemotos in Caracas, Venezuela. Even in the field of this sport a mark of triple tuning forks has become so renowned with numerous wins gained by them.



**MOST IMPRESSIVE** was a parade of Teheran policemen on 250 Yamaha motorcycles to commemorate the 21st AZAR (Iranian National Holiday). They paraded in front of His Imperial Majesty,

The Shahinshah and then proceeded through the main streets. The people greeted them with loud applause and beautiful flowers.

## Medium-weight Ace

# Yamaha YCS-1 180cc

Yamaha has announced another new model, YCS-1 180 cc to join the established twin series. This new five-speeder with dual carbureters is claimed to be the medium-weight ace with numerous technical innovations and exciting performance far above the level. It can cover the standing quarter-mile in 16.9 seconds and reach the speeds of 85-90 mph with no strain felt. These figures are unmatched in its class and duly approved worth highway cruising. Yamaha's metallic bond cylinder is also adopted.



### SPECIFICATIONS OF YAMAHA 180 Model YCS-1

<b>PERFORMANCE</b>	
Maximum speed	140 kmh. (85—90 mp/h)
Normal fuel consumption	55 km/L @ 40 km/h. (130 mg. @ 25 mph)
Climbing ability	23 degree
Braking distance	12 m (40 ft) @ 50 kmh (30 mp/h)
Minimum turning radius	2,050 mm (81 in.)
<b>ENGINE</b>	
Bore x Stroke	50 x 46 mm
Displacement	180.6 cc
Compression ratio	7.4 : 1
Maximum horsepower	21 HP @ 8,000 rpm
Maximum torque	2.0 kg.m @ 7,000 rpm (14.5 ft. lbs.)
Starting system	Electric and kick
<b>DIMENSIONS</b>	
Overall length	1,920 mm 75.6 in.
Overall width	765 mm 30.0 in.
Overall height	995 mm 39.2 in.
Wheelbase	1,245 mm 49.0 in.
Min. ground clearance	155 mm 6.1 in.
Weight	120 kg 265 lbs.
FUEL TANK CAPACITY	11.4 L. 3.3 gal.
OIL TANK CAPACITY	1.9 L. 2.0 qt.
<b>TIRES</b>	
Front	2.50—18—4 P.R.
Rear	2.75—18—4 P.R.

### Newly Designed Powerful Engine

"Auto-Lube" oil injection system applied: The highest quality pump, excellent mechanism, proven already with hundreds thousands of Yamaha motorcycles and mopeds all over the world.

The engine is of twin aluminum cylinder with patented welded iron sleeve applied and with 5 speed transmission.

### Newly Designed Light Tube Frame

Light and sturdy tube frame will enable you to enjoy the nice riding from low speed to top speed.

### Electric Starting

With strong battery 12V9AH installed, the engine can start quickly with push button.

### Beautiful Finish

First, you will notice beautiful candy tone colors, red and blue.

Secondly, gasoline tanks are chrome-plated and of seamless finish.

Front and rear fenders are also chrome-plated. Such combination gives an excellent appearance.

### Changeable Strength of Rear Cushion

The strength of rear cushion is changeable in three: Hard, medium and soft cushion.

### Efficient and Strong Brake

With twin leading (brake) shoe adopted on front, powerful brake assures you of more safety, assisted by water proof mechanism.

**4**  
**YAMAHA'S**  
**BINKY**

R. ANDO

