

## Introduction of Product

### Introduction of Compact Excavator PC56-7

Kiyoshi Sugiyama

Motoyuki Kawashima

*Portraying the concepts “Environment,” “Safety” and “IT,” which are the common features of Komatsu, the compact excavator PC56-7 has been developed and introduced in the Chinese market. This introduction of product explains the background to its development and technology, and introduces the above described product.*

**Key Words:** PC56-7, New Chinese emission regulation, Safety, KOMTRAX, Durability, Work Mode, Maintainability

## 1. Introduction

Demand for compact excavators in China is increasing year after year. The market especially for the 5-ton class introduced in this report is large. In 2005, Komatsu started local production of the PC55MR-2 (initial model name was PC50MR-2) and sale of this model in the Chinese market began.

The PC56-7 as an M/C machine of the PC55MR-2 has recently been developed to conform to the new emission regulation to be enforced in China beginning 2010 and to more minutely tune to the needs of the Chinese market. The new model has debuted in the Chinese market. The outline of the new compact excavator is described (Photo 1, Table 1).



Photo 1 PC56-7

Table 1 Principal specifications

| Item                     | Unit           | PC56-7    | PC55MR-2  |
|--------------------------|----------------|-----------|-----------|
| Machine mass             | kg             | 5300      | 5420      |
| Rated output             | KW/rpm         | 34.6/2300 | 29.4/2350 |
| Standard bucket capacity | m <sup>3</sup> | 0.20      | 0.18      |
| Maximum digging depth    | mm             | 3800      | 3800      |
| Maximum digging radius   | mm             | 6120      | 6220      |
| Tail swing radius        | mm             | 1650      | 1060      |
| Fuel tank capacity       | L              | 120       | 80        |

## 2. Aims of Development

Based on “Environment,” “Safety” and “IT,” which are the basic concepts of Komatsu for the development of its construction machines, the PC56-7 is a compact excavator that has enhanced merchandise capability by achieving higher quality and more precisely meeting the needs of the Chinese market.

The PC56-7 is outlined below.

- (1) Enhanced durability and reliability
  - More rugged undercarriage and work equipment
  - Reduced load by a reduction in machine mass
- (2) Enhanced workability and controllability
  - Enhanced workability through higher engine output
  - Setting of two work modes
  - Enhanced comfortableness in automatic transmission during traveling

- (3) Environment
    - Compliance with new Chinese emission regulation
  - (4) Safety and comfortableness
    - Engine neutral start\*
    - Installation of newly designed large cab and large seat
    - Installation of air conditioner as a standard equipment\*
  - (5) IT
    - Installation of KOMTRAX\* as a standard equipment
  - (6) Enhanced maintainability
    - Sheeting machine covers
    - Concentrated arrangement of the filters and other components
    - Additional filters\*
    - Large fuel tank
- (\*: Incorporation modification of item already in conventional model)

### 3. Principal Selling Points and How They are Accomplished

The principal selling points of the PC56-7 incorporating the foregoing features and how they were accomplished are described.

#### 3.1 Enhanced durability

In China, even compact-sized machines are often used in a continuously long operating hours continuously and needs for high durability are strong. At the same time, a recent prominent trend is for the installation of a bucket with a large capacity. To meet these requirements, the PC56-7 incorporates the following improvements.

##### 3.1.1 More rugged undercarriage

The undercarriage has been reinforced compared with the conventional model (Photo 2).

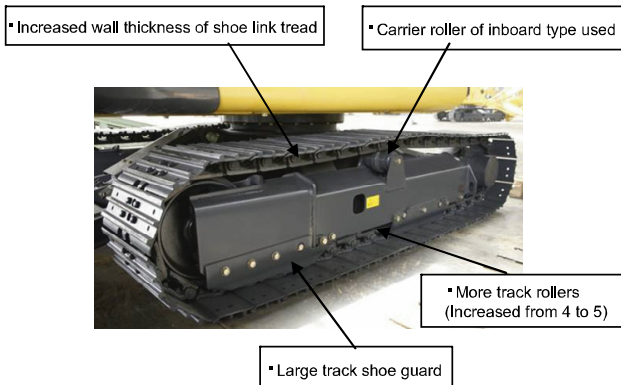


Photo 2 Actions taken to reinforce undercarriage

#### 3.1.2 Enhanced work equipment

The work equipment has been made more rugged to cope with the increase in bucket capacity to enhance its durability (Photo 3).

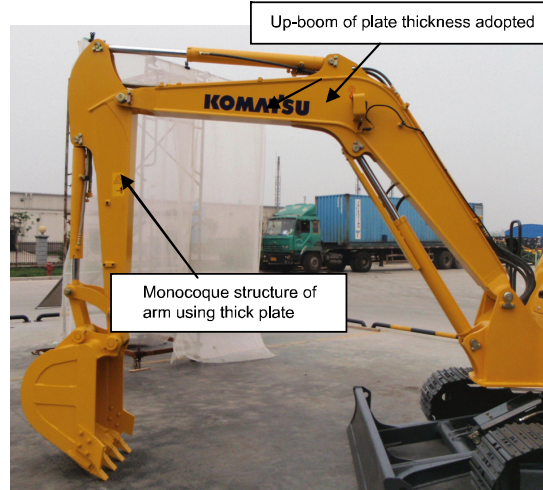


Photo 3 Reinforced work equipment

#### 3.1.3 Reduction in machine mass

The needs for small tail swing machines are small in the Chinese market. A reduction in the machine mass was accomplished by securing machine stability by increasing the vehicle moment while maintaining a layout for regular type machines (Fig. 1, Table 2).

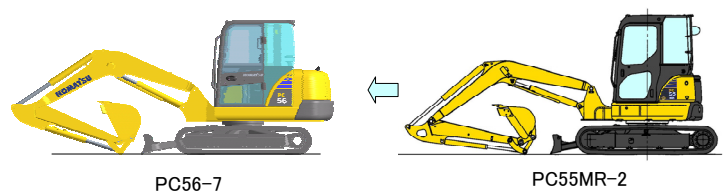


Fig. 1 Shape of machine body

Table 2 Reduction in machine mass

| Item              | Unit | PC56-7 | PC55MR-2 |
|-------------------|------|--------|----------|
| Machine mass      | kg   | 5300   | 5420     |
| Tail swing radius | mm   | 1650   | 1060     |

### 3.2 Enhanced workability and controllability

#### 3.2.1 Higher engine output

The PC56-7 increases its engine output through an increase in piston displacement and a turbo charger attached to the engine, capable of controlling a reduction in engine output in a high-elevation place. The engine clears the new emission regulation scheduled to be enforced in China beginning October, 2010 (Photo 4, Table 3).

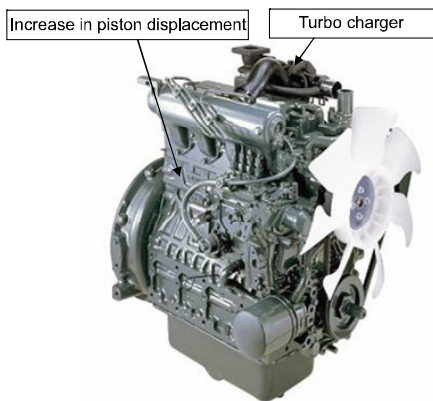


Photo 4 Engine

Table 3 Engine specifications

| Item                | Unit   | PC56-7    | PC55MR-2  |
|---------------------|--------|-----------|-----------|
| Model               | —      | S4D87E-1  | 4D88E-5   |
| Rated output        | KW/rpm | 34.6/2300 | 29.4/2350 |
| Piston displacement | cc     | 2434      | 2189      |

#### 3.2.2 Work mode setting

The PC56-7 sets two modes that can be selected in accordance with the work to be performed, namely, the “Standard mode” that gives priority to reducing the fuel consumption and “P mode” that gives priority to the work rate. A detent is installed so that the throttle bar can be adjusted to a position that achieves the best fuel consumption while securing work performance of a certain level (Photo 5).

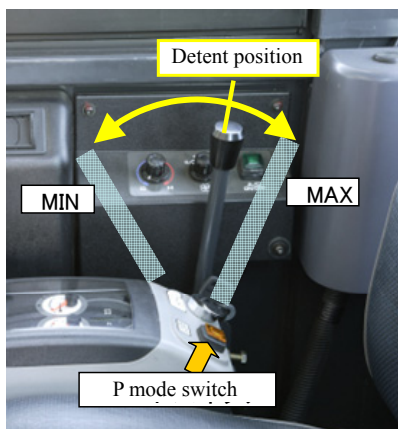


Photo 5 Mode switches

#### 3.2.3 Enhanced comfortableness in automatic transmission during traveling

The installation position of the transmission switches to change the transmission from auto second gear to first gear fixed and back from first gear fixed to auto second gear in automatic transmission function during work while traveling has been moved from the monitor panel to the blade lever. This enables gear shifting without removing the hand from the blade lever when pushing soil by the blade while traveling on leveled land (Photo 6).

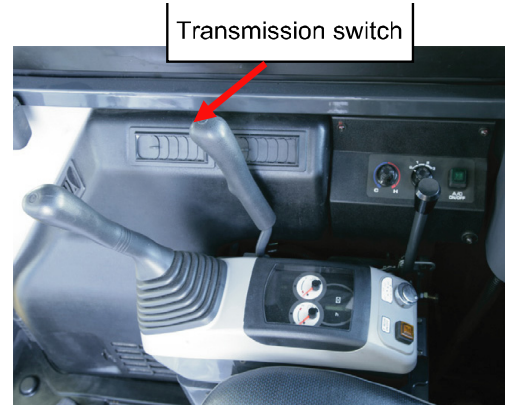


Photo 6 Automatic transmission switches during traveling

### 3.3 Comfortableness

A newly designed large cab is installed as the operator’s cab to enlarge the undercarriage space. The cab has larger glass panes to ensure a good visibility in the front and rear (Photo 7).

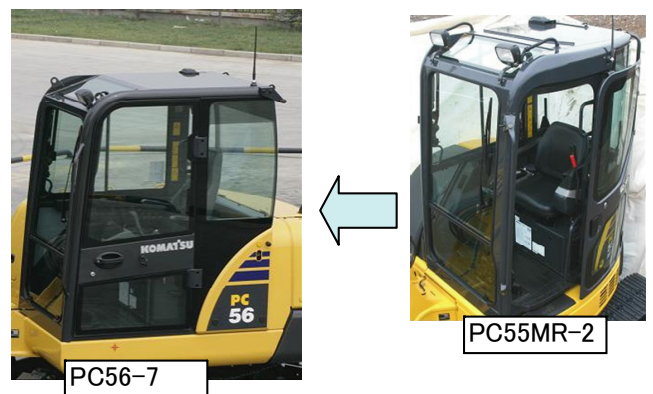


Photo 7 Operator’s cab



The operator seat is a large seat equipped with a front and rear sliding function and backrest function so that even an operator with a large physique can work comfortably in the cab (Photo 8).

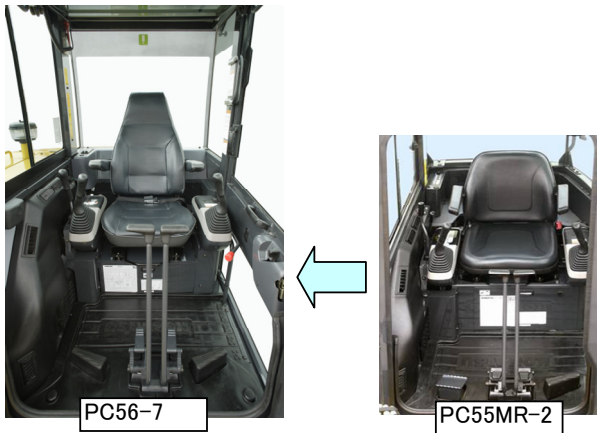


Photo 8 Large seat

### 3.4 Enhanced maintainability

#### 3.4.1 Sheeting machine covers

All the machine covers are made of sheeting for easy repairs and maintenance.

#### 3.4.2 Additional filters and concentrated arrangement

The fuel system has a water separator, pre-filter and main filter to ensure fuel cleanliness and to prevent mixing of water.

The intake system is equipped with a pre-cleaner and an air cleaner having double elements, to prevent mixing of fine particles.

The filters and other components are arranged concentratedly inside the engine room, allowing easy cleaning and replacement of components (Photo 9).

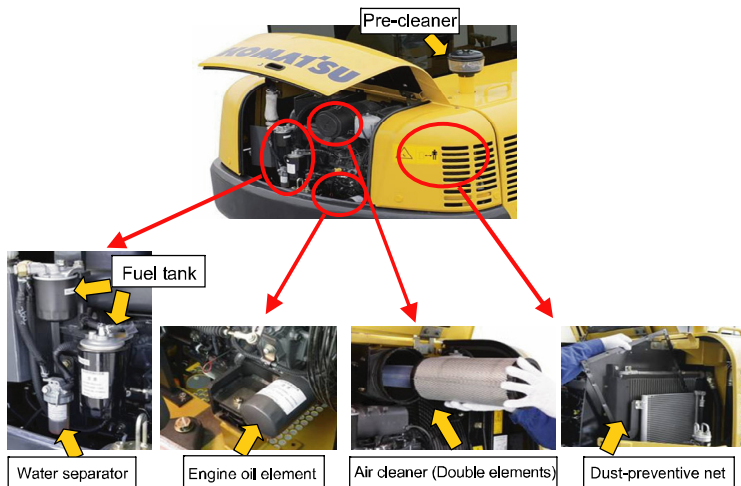


Photo 9 Additional filters and other components concentrated arrangement

#### 3.4.3 Large fuel tank

The fuel tank capacity has been increased 1.5 times compared with the conventional model. The large tank capacity increases the operation hours after one oil filling, to reduce the oil filling frequency. A step is installed for ease of oil filling work.

Minute consideration is given such as installing a grease pail can pocket using the newly added step (Photo 10).

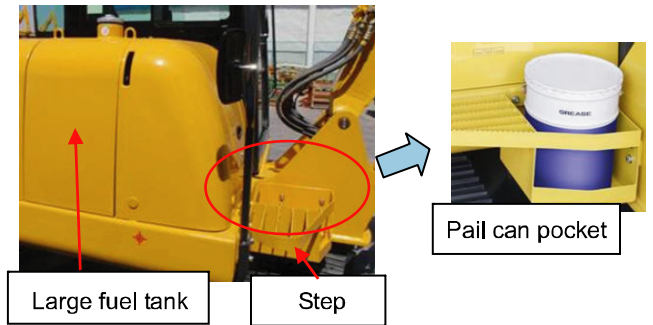


Photo 10 Large fuel tank and step structure

## 4. Conclusion

Several months have passed since the M/C machine that further meets market requests was developed and put onto the market as the demand for compact excavators expands in China. A generally good evaluation is obtained in response to the objective of developing an M/C machine, indicating that the effects of introducing a new compact excavator have been achieved. The merchandise capability will be continuously strengthened to further accelerate the development effort.

**Introduction to the writers**



**Kiyoshi Sugiyama**

Entered Komatsu in 1977.  
Currently assigned to the Construction  
Equipment Development Group, Technical  
Center, Development Division, Komatsu  
Utility Co., Ltd.



**Motoyuki Kawashima**

Entered Komatsu Zenoah Co., Ltd. in 1990.  
Currently assigned to the WG Department,  
Product Strategy Division, Komatsu Utility  
Co., Ltd.

**[A few words from the writers]**

The various components of the machine body of the newly developed model were drastically changed compared with the conventional model. For this newly produced vehicle in China, the development members were kept busy in making adjustments and in other work. However, the model could be introduced into the market at good timing through the cooperation of the related departments. The authors hope that the new model will be able to continuously receive a good evaluation in the Chinese market in the future.