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HYDRAULIC SYSTEMS AND COMPONENTS FOR MEDIUM-SIZED BULLDOZER

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ABSTRACT

Introduce KOMATSU's newest hydraulic systems and components for medium-sized bulldozer, which includes electronic controlled HST (Hydro Static Transmission) and hydraulically drive fan system. Electronic controlled HST consists of tandem piston pumps and two inside-shoe type final drives. Inside-shoe type final drive consists of bent axis type piston motor and 2 stage planetary reduction gear. Hydraulically drive fan system consists of variable piston pump common with work equipment pump and in-fan type fixed motor. This system is also electronically controlled. By using these hydraulic systems and components, layout flexibility and vehicle design flexibility are drastically improved, therefore this bulldozer can get unrivaled blade visibility and productivity at the same time.

KEY WORDS

HST, Bulldozer, Electronic controlled HST, Inside-shoe type final drives, Hydraulically drive fan

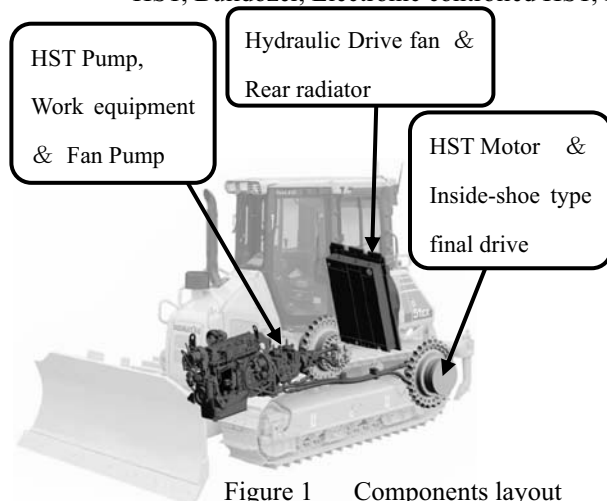


Figure 1 Components layout



Figure 2 Unrivaled blade visibility

1. TARGET AND ISSUES

To improve total performance by

- ① Create unrivaled blade visibility by super-slant nose.
- ② Increasing productivity and reducing hydraulic loss.

2. SOLUTION OF THE TARGET AND ISSUES

- a) Change power train transmission with clutch and brake to HST.
- b) Change front mount radiator with in-fan type motor to rear mount radiator with in-fan type motor. By using HST drive and hydraulic drive fan systems, component's layout flexibility and vehicle design flexibility are drastically improved, therefore this bulldozer can get unrivaled blade visibility.
- c) Seamless traction force and power turn by Electronic controlled HST with continuously variable pump and motor.

Speed sensor in both travel motors ensure straight tracking, even working on slopes and with uneven blade loads.

- d) Change work equipment pump from two fixed gear pump to one variable pump and CLSS (Closed Center Load Sensing System) and change fan control system from surplus flow by-pass type in-fan type motor to fixed in-fan type motor and variable pump (common with work equipment pump) and CLSS.

This fan system is also electronically controlled by control valve with EPC valve.

Take out engine power efficiently at all speed range by electronic controlled HST.

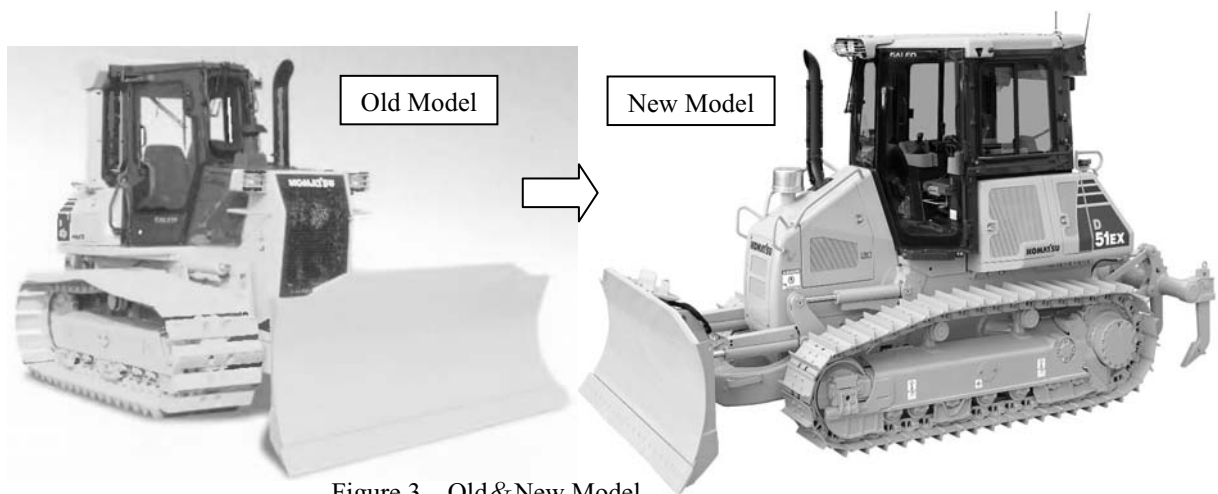


Figure 3 Old&New Model

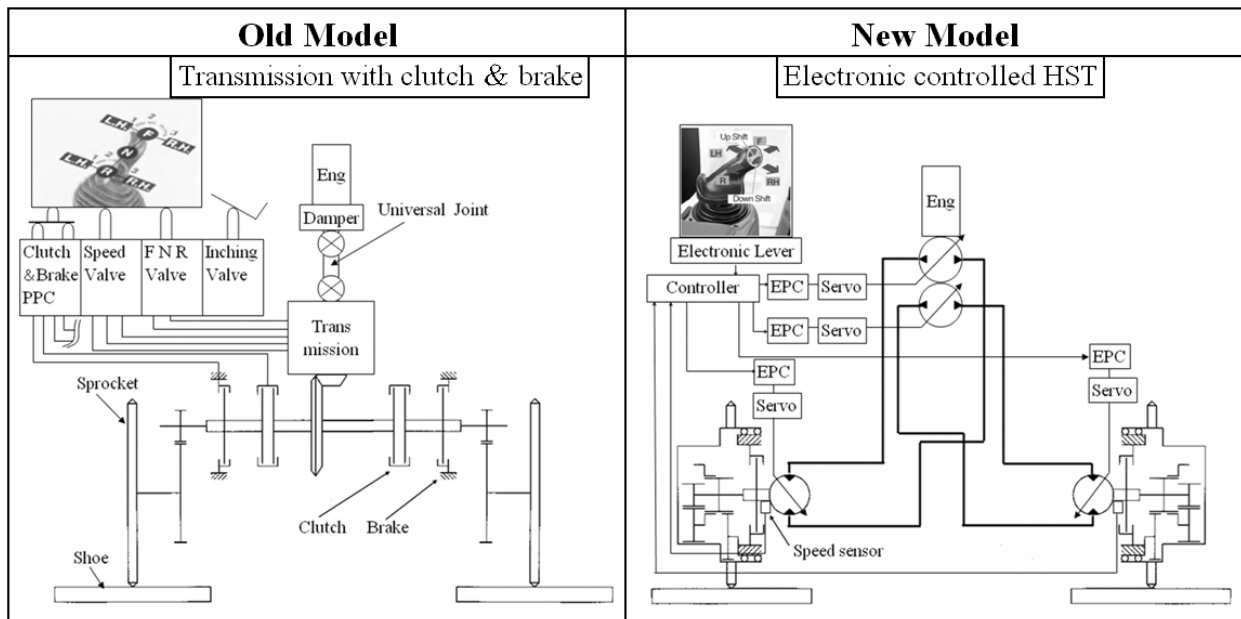


Figure 4 Comparison of power train

3. HYDRAULIC COMPONENTS

- ① HST Pump
 - a) Superior Durability and Reliability
 - Variable displacement swash plate type piston pump using common internal parts with other KOMATSU made reliable construction machines.
 - b) For electronic
 - Electronic controlled in-line servo structure with EPC Valve (Electronic Pressure Control Valve)
- ② HST Motor
 - a) Superior Durability and Reliability
 - Variable bent axis piston motor same concept with other KOMATSU made reliable construction machines.
 - Free from attack by rock or soil owing to inside-shoe final drive layout.
 - Easy accessibility and maintainability by modular designed inside-shoe type final drive integrated with HST motor and reduction gear.
 - b) For Electronic
 - Electronic controlled in-line servo structure by control pressure from frame mounted EPC Valve.

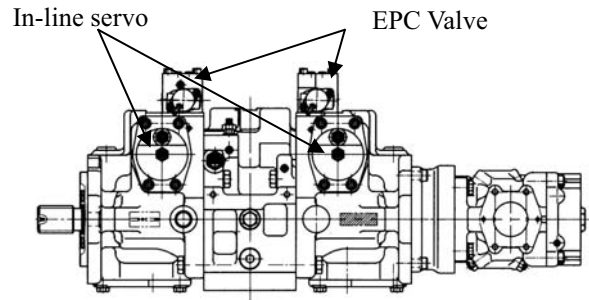


Figure 5 HST Pump

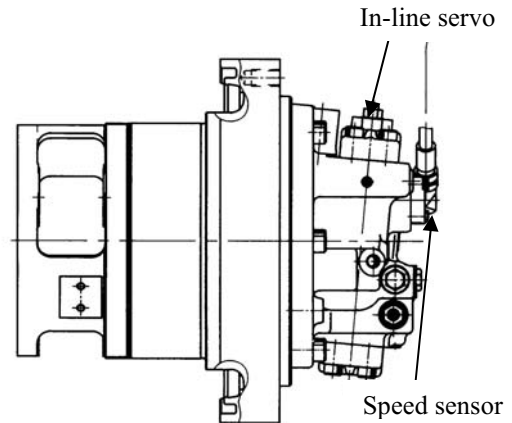


Figure 6 HST Motor

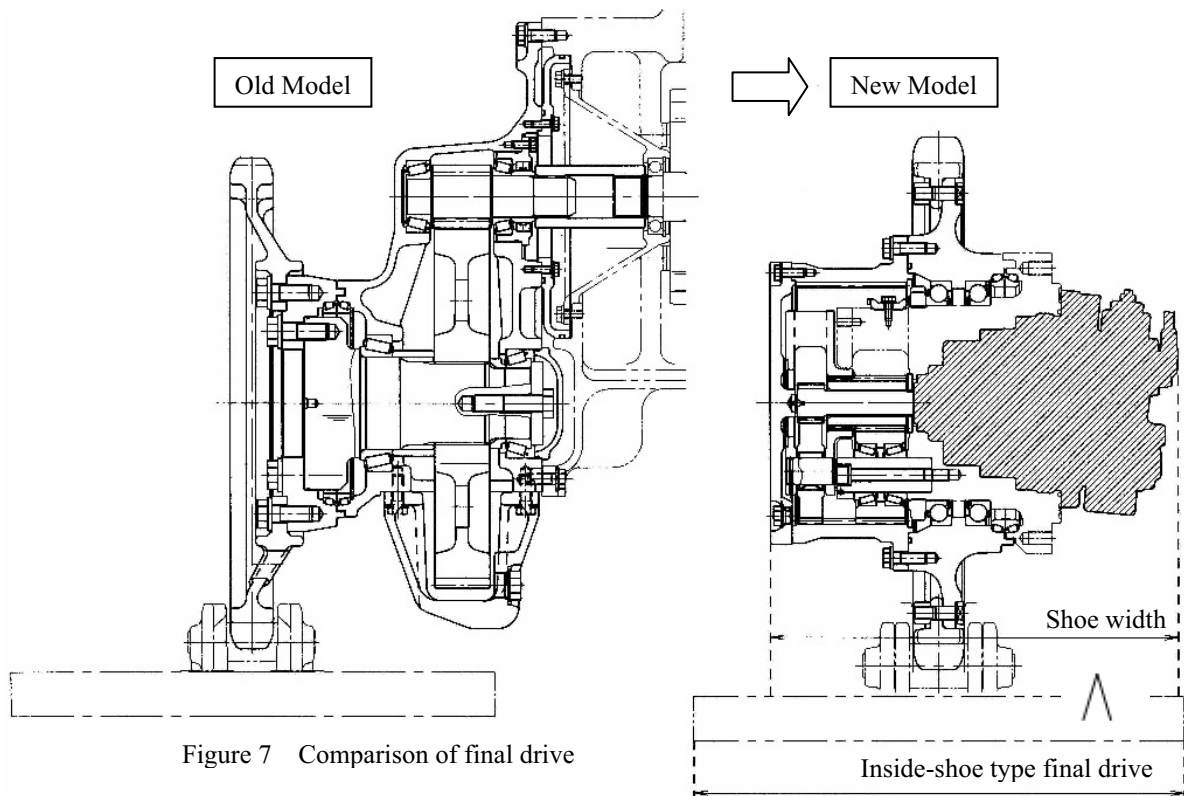


Figure 7 Comparison of final drive

4. CONCLUSION

KOMATSU's newest hydraulic systems and components for medium-sized bulldozer

- ① Create unrivaled blade visibility by super-slant nose.
- ② Increasing productivity and reducing hydraulic loss.
 - a) Change power train transmission with clutch and brake to HST.
 - b) Change front mount radiator with in-fan type motor to rear mount radiator with in-fan type motor.
 - c) Seamless traction force and power turn by electronic controlled HST with continuously variable pump and motor.
Speed sensor in both travel motors ensure straight tracking, even working on slopes and with uneven blade loads.
 - d) Change work equipment pump from two fixed gear pump to one variable pump and CLSS and change fan control system from surplus flow by-pass type in-fan type motor to fixed in-fan type motor and variable pump (common with work equipment pump) and CLSS.

This fan system is also electronically controlled by control valve with EPC valve.

Take out engine power efficiently at all speed range by electronic controlled HST.

5. FUTURE PLAN

We will try to improve hydraulic systems and components day by day, so as to achieve construction machine's selling point, and to contribute to the customer's benefit

These concepts were adapted to 3 more models which will be launched soon.

6. REFERENCES

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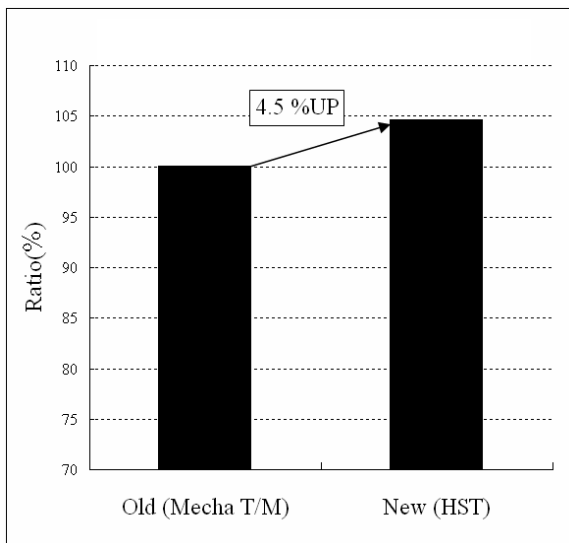


Figure 8 Comparison of productivity(m³/L)