

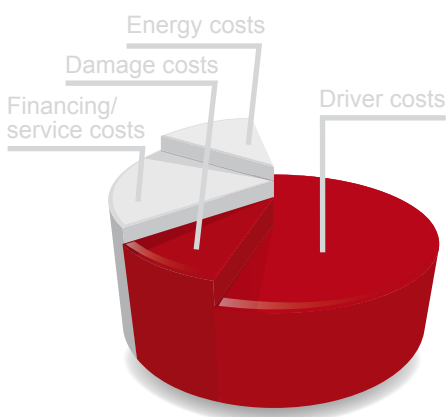
# ONLY TOYOTA TRUCKS WITH SAS KNOW HOW



# TO DRIVE DOWN COSTS



Toyota forklift trucks equipped with the Toyota System of Active Stability (SAS) use intelligent technologies to reduce your driver costs and damage costs. This could be a significant reduction in overall truck operating costs. Workflow is faster and safer, therefore improving productivity. **Only Toyota trucks with SAS know how to move loads safely and drive down costs.**



## Savings you can see

SAS addresses costs in two key areas: driver costs and damage costs. These areas can collectively account for more than 70% of your truck's total operating costs. SAS can deliver immediate savings, protecting your drivers and your bottom line.



**Six reasons why SAS delivers savings**

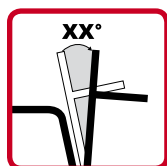
As the focus on workplace safety increases, SAS stands out as technology that actively reduces the risk of accidents. Unique to Toyota forklift trucks, this patented dynamic system comprises ten sensors, three actuators and a controller. SAS constantly monitors forklift operations and automatically takes corrective action when it senses factors that could lead to truck or load instability. Its six advanced functions work together to keep your driver and goods safely on the move – improving productivity.



Swing Lock Cylinder



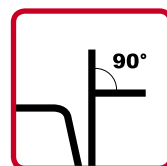
Speed reduction when cornering



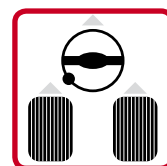
Mast Front Tilt Angle Control



Mast Rear Tilt Speed Control



Fork Levelling Control



Active Steering Synchroniser



# ONLY TOYOTA TRUCKS WITH SAS KNOW HOW TO STEER CLEAR OF UNNECESSA



**SAS acts automatically to prevent sideways tip-over – the cause of over 30% of serious forklift accidents**

### **Swing Lock Cylinder**

SAS reduces risks during turning without compromising productivity. If the truck becomes unstable during a turn, the patented Swing Lock Cylinder automatically locks the rear axle to increase the truck's stability footprint – greatly reducing the risk of a sideways tip-over. Acting even faster than the most experienced driver, SAS provides excellent stability to help protect operators and reduce damage to trucks.

### **Speed reduction when cornering**

If SAS senses the turning speed is too high, it overrides the driver's instructions and automatically slows the truck to keep the wheels and load in the proper position. Avoiding accidents, keeps your drivers safe and your equipment in excellent working condition.

Please note that Toyota forklift models are equipped with either the SAS Swing Lock Cylinder or SAS speed reduction when cornering. Consult the relevant product brochure for details specifications.

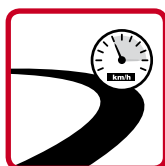
# RY DAMAGES TO TRUCKS



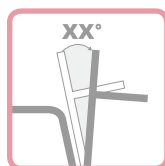
**SAS** functions help protect the condition of your truck. By preventing accidents and minimising unnecessary wear and tear. SAS keeps repair costs down.



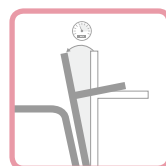
Swing Lock Cylinder



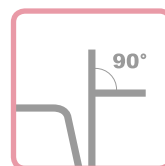
Speed reduction when cornering



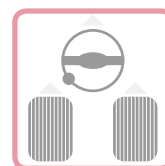
Mast Front Tilt Angle Control



Mast Rear Tilt Speed Control



Fork Levelling Control



Active Steering Synchroniser



# ONLY TOYOTA TRUCKS WITH SAS KNOW HOW TO DRIVE DOWN DAMAGES TO GO



**SAS helps to avoid damages to goods and related costs in an industry where accidents are far too common**

### **Mast Front Tilt Angle Control**

SAS prevents both the load and truck from tipping dangerously forward. Mast Front Tilt Angle Control monitors load height, weight and mast position. If necessary, it automatically limits the mast angle to protect the driver and load. This reduces the risk of injury and property damage and can benefit other hidden costs i.e. lower insurance premiums.

### **Mast Rear Tilt Speed Control**

When loads are tilted backwards too quickly, they can put the driver, goods and the truck at risk. Mast Rear Tilt Speed Control senses possible risk factors and reduces the mast speed accordingly. The load moves surely and steadily into the right position and work carries on.

### **Fork Levelling Control**

Adjusting the forks to a level horizontal position takes a little extra time – every time. With SAS Fork Levelling Control, the forks are levelled at the push of a button, making work easier for the driver, particularly when loads are at height. This saves time, which increases productivity and saves you money.

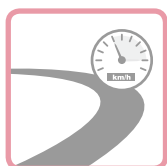
# ODS



**SAS** is always active to protect your driver, truck and goods. By minimising the chance of load loss or accidents, SAS can save your time and money otherwise spent on customer claims, insurance premiums, clean-up and lost productivity.



Swing Lock  
Cylinder



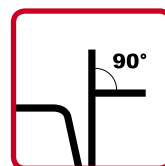
Speed reduction  
when cornering



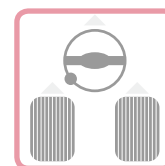
Mast Front Tilt  
Angle Control



Mast Rear Tilt  
Speed Control



Fork Levelling  
Control



Active Steering  
Synchroniser



# ONLY TOYOTA TRUCKS WITH SAS KNOW HOW TO DRIVE DOWN DRIVER COSTS



**From novice drivers to experienced operators, SAS supports better productivity and efficiency**

### **Active Steering Synchroniser**

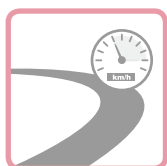
The SAS Active Steering Synchroniser helps the operator by automatically aligning the steering wheel with the rear wheels. Your drivers work ergonomically and always know which direction the truck will steer for safe, productive operation.



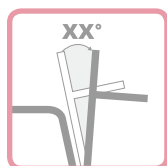
All **SAS** functions work together to enhance driver confidence and reduce the number of repetitive driver actions needed to handle each load. This makes handling operations simpler, safer and more efficient – helping you to optimise driver costs.



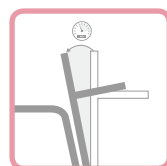
Swing Lock  
 Cylinder



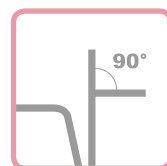
Speed reduction  
 when cornering



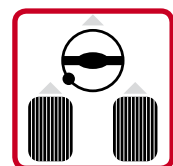
Mast Front Tilt  
 Angle Control



Mast Rear Tilt  
 Speed Control



Fork Levelling  
 Control



Active Steering  
 Synchroniser

# ONLY TOYOTA TRUCKS WITH SAS HAVE THIS KIND OF KNOW HOW



Toyota SAS is the product of years of experience in engineering and advanced automotive technology. An industry premiere and still unique in the business, patented Toyota SAS technology draws on Toyota's leadership in developing automotive safety systems. SAS dynamically manages lift truck stability for class-leading safety and productivity. SAS now comes as standard in:

**Engine powered forklifts 1.5 to 5.0 tonne**  
**Electric powered forklifts 1.0 to 8.5 tonne**

## SAS SENSORS

(Placement indicated here on Toyota engine powered forklift)

- ① **Fork Height Switch** – senses whether the mast is higher than approx 2m.
- ② **Tilt Angle Sensor** – senses mast angle
- ③ **Front Tilt Limit Switch** – senses when the operator tilts the forks forwards
- ④ **Rear Tilt Limit Switch** – senses when the operator tilts the forks backwards
- ⑤ **Load Sensor** – measures load weight using hydraulic pressure
- ⑥ **Tilt Knob Switch** – senses when the operator depresses the tilt switch
- ⑦ **Vehicle Speed Sensor** – measures vehicle speed
- ⑧ **Steering Wheel Angle Sensor** – measures position of steering wheel
- ⑨ **Tyre Angle Sensor** – measures angle of rear wheels
- ⑩ **Yaw Rate Sensor** – measures truck lateral acceleration

## SAS ACTUATORS

(Placement indicated here on Toyota engine powered forklift)

- ⑪ **Swing Lock Cylinder** – locks the rear axle
- ⑫ **Hydraulic Oil Control Valve** – regulates oil flow to tilt cylinders
- ⑬ **Steering Synchroniser Solenoid** – regulates oil flow to steering cylinder to align steering knob position with rear wheels

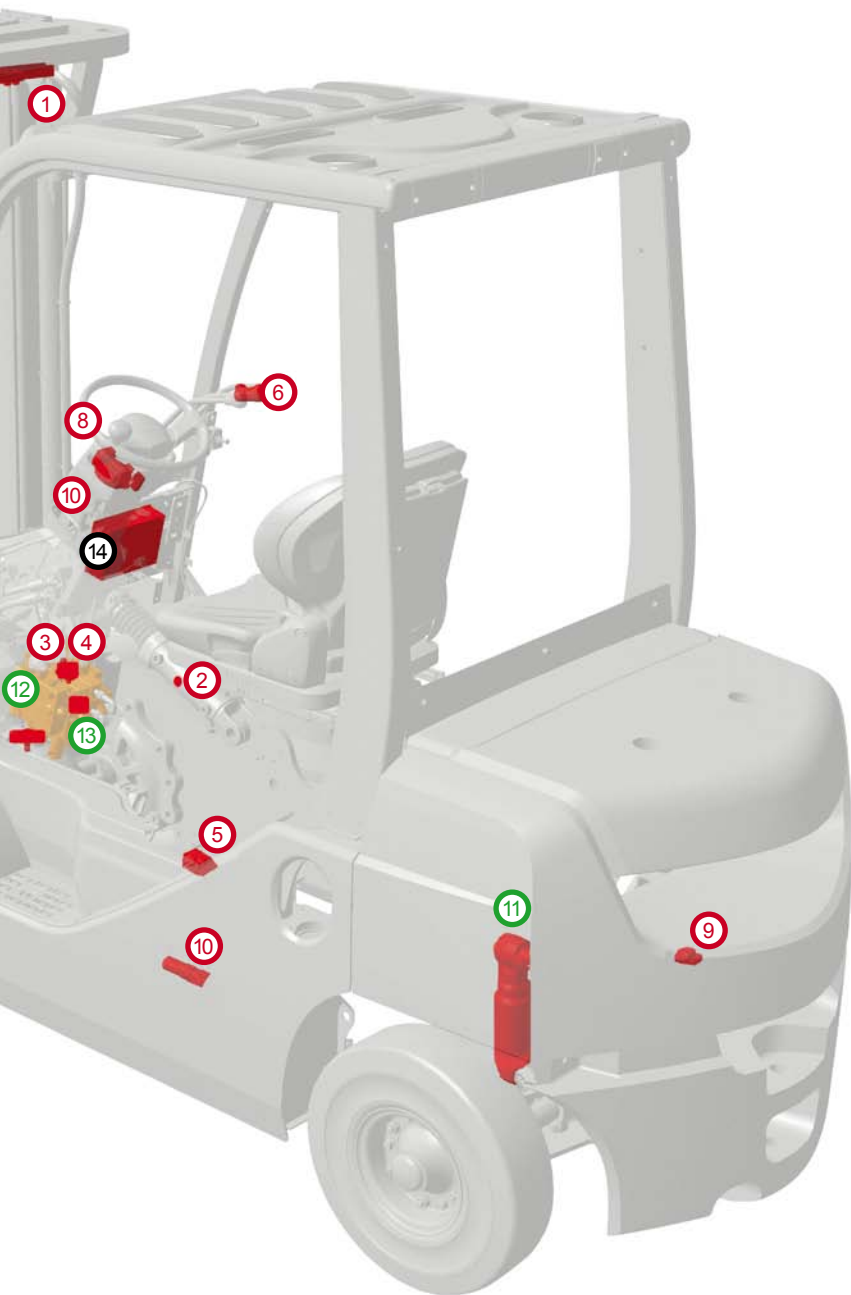
## THE SAS CONTROLLER

(Placement indicated here on Toyota engine powered forklift)

- ⑭ Toyota's SAS controller uses information from the SAS sensors to determine whether action is needed. When necessary the controller activates the SAS actuators to support excellent safety and productivity.

Even the best technology cannot guarantee accident-free operation. Proper training, the establishment of appropriate work rules, and enforcement of safety regulations will have the greatest impact on workplace safety.





Swing Lock Cylinder

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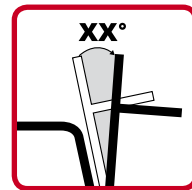
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Speed reduction when cornering



Mast Front Tilt Angle Control

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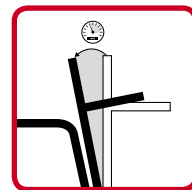
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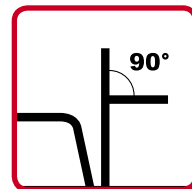
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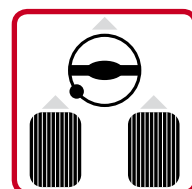
14



Mast Rear Tilt Speed Control



Fork Levelling Control



Active Steering Synchroniser

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The data in this brochure was determined based on our standard testing conditions. Operating performance may vary depending on the actual specification and condition of the truck as well as the condition of the operating area. Availability and specifications are determined regionally and are subject to change without notice. Please consult your authorised Toyota distributor for details. Due to photography and printing, colour of actual forklift may vary from this brochure. Some pictures have been computer enhanced.

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