

## Identification Terminology of Earthmoving Machines

**Foreword**—This document has only been changed to comply with the new SAE Technical Standards Board format. Scope has changed to Section 1, Purpose changed to 1.1, and References were added as Section 2.

- 1. Scope**—This standard identifies earthmoving machines which are intended for use on unimproved surfaces. The machines are used for moving earth and other materials on projects such as road building, dams, open pit excavation, trenching, and buildings. Excluded are machines intended for use on improved surfaces such as "in-plant" material handling, highways, water, air transport, and for agricultural purposes.

The parts of the standard are: loaders, dumpers, tractor-scrappers, graders, tractors, excavators, and backhoe loaders. Additional parts will be developed if and when requested.

- 1.1 Purpose**—This standard sets forth accepted terminology to name and identify types of earthmoving machines, and is based upon existing commercial earthmoving machines. Illustrations are used to identify functional characteristics.

The terminology establishes a name for a basic work machine such that it is not renamed when various components are mounted to it. For example, when a dozer is mounted on a "tractor", the work machine can be referred to as "tractor with dozer."

The following definitions apply to these earthmoving machines:

**Equipment:** Set of components mounted to the base machine to fulfill the primary design function.

**Attachment:** Optional assembly of components that can be mounted to the base machine for a specific use.

**Component:** Part or assembly of parts of a base machine, equipment, or attachment.

As a further illustration of this principle, here are some common working tool attachments. These are designed with the intention that they can be added (and removed) without modification to the basic machine, thereby enabling the machine to efficiently perform other work.

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For Loaders

Backhoe  
Sideboom  
Scarifier  
Pallet fork  
Snow Plow

For Graders

Dozer  
Scarifier  
Snow Plow  
Snow Wing

For Tractors

Backhoe  
Dozer  
Sideboom  
Direct Burial Plow  
Ripper

2. **References**—There are no referenced publications specified herein.

3. **Loader Definition**—A self-propelled machine with an integral front-mounted bucket supporting structure and linkage that loads material into the bucket through forward motion of the machine and lifts, transports, and discharges material. Not included are tractors with front-end loader attachment.

3.1 **Crawler Loaders**

3.1.1 Front engine.

3.1.2 Rear engine.

3.2 **Wheel Loaders**

3.2.1 Rigid frame, with means of steering and propulsion as follows:

3.2.1.1 Vacated.

3.2.1.2 Four wheel, front-wheel steer, rear-wheel drive, rear engine.

3.2.1.3 Four wheel, rear-wheel steer, four-wheel drive, front engine.

3.2.1.4 Four wheel, rear-wheel steer, four-wheel drive, rear engine.

3.2.1.5 Three wheel, rear-wheel steer, front-wheel drive.

3.2.1.6 Four wheel, rear-wheel steer, front-wheel drive.

3.2.1.7 Four wheel, front- and rear-wheel steer, four-wheel drive.

3.2.1.8 Four wheel, skid steer, four-wheel drive.

3.2.2 Articulated frame, with means of steering and propulsion as follows:

3.2.2.1 Four wheel, articulated steer, four-wheel drive, operator front.

3.2.2.2 Four wheel, articulated steer, four-wheel drive, operator rear.

**4. Dumper Definition**—A self-propelled machine having an open cargo body, designed to transport and dump or spread material. Loading is done by means external of the dumper. Dumpers include the following types:

**4.1 Rear Dump**

**4.1.1 FRONT-WHEEL STEER**

- 4.1.1.1 Two axles, rear-axle drive.
- 4.1.1.2 Two axles, rear-axle drive, two-way seat and controls.
- 4.1.1.3 Two axles, two-axle drive.
- 4.1.1.4 Three axles, center-axle drive.
- 4.1.1.5 Three axles, center- and rear-axle drive.

**4.1.2 ARTICULATED STEER**

- 4.1.2.1 Two axles, front-axle drive.
- 4.1.2.2 Two axles, two-axle drive.
- 4.1.2.3 Three axles, front- and center-axle drive.
- 4.1.2.4 Three axles, all drive.

**4.2 Side Dump**

**4.2.1 FRONT-WHEEL STEER**

- 4.2.1.1 Three axles, center-axle drive.

**4.3 Bottom Dump**

**4.3.1 FRONT-WHEEL STEER**

- 4.3.1.1 Two axles, rear engine and drive.
- 4.3.1.2 Three axles, center-axle drive.
- 4.3.1.3 Four axles, single-axle drive, tandem trailing axles.
- 4.3.1.4 Five axles, tandem-axle drive, tandem trailing axles.

**4.3.2 ARTICULATED STEER**

- 4.3.2.1 Two axles, front-axle drive.

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5. **Tractor-Scraper Definition**—A self-propelled machine, having a cutting edge positioned between front and rear axles, which loads, transports, discharges, and spreads material. Tractor-scrapers include the following types:

5.1 Open bowl, with means of steering and propulsion as follows:

5.1.1 Two axles, articulated steer, front axle drive.

5.1.2 Two axles, articulated steer, two axle drive.

5.1.3 Three axles, articulated steer, front and center axle drive (articulated tractor or four-wheel steer tractor).

5.1.4 Three axles, front wheel steer, center axle drive.

5.1.5 Three axles, front wheel steer, center and rear axle drive.

5.2 Self-loading, with separately powered mechanism, with means of steering and propulsion as follows:

5.2.1 Two axles, articulated steer, front axle drive.

5.2.2 Two axles, articulated steer, two axle drive.

5.2.3 Three axles, front wheel steer, center axle drive.

5.2.4 Three axles, articulated steer, front and center axle drive (articulated tractor or four wheel steer tractor).

6. **Grader Definition**—A self-propelled machine having an adjustable blade, positioned between front and rear axles to cut, move, and spread material, usually to grade requirements:

6.1 Rigid frame with means of steering and propulsion as follows:

6.1.1 Four wheel, front wheel steer, two wheel drive (front engine).

6.1.2 Four wheel, front and rear wheel steer, four wheel drive.

6.1.3 Six wheel, front wheel steer, four wheel drive.

6.1.4 Six wheel, front wheel and rear bogie steer, six wheel drive.

6.2 Articulated frame with means of steering and propulsion as follows:

6.2.1 Six wheel, front wheel and articulated steer, four wheel drive.

6.2.2 Four wheel, double articulated steer, four wheel drive.

7. **Tractor Definition**—A self-propelled machine used to exert a push or pull force through mounted equipment (dozer, drawbar, or ripper) to move objects or material. Tractors include both crawler tractors and wheel tractors.

7.1 **Crawler Tractor**

7.2 **Wheel Tractor**

7.2.1 Rigid frame, with means of steering and propulsion as follows:

7.2.1.1 Four wheel, rear wheel steer, four wheel drive.

7.2.1.2 Four wheel, front wheel steer, rear wheel drive.

7.2.2 Articulated frame, with means of steering and propulsion as follows:

7.2.2.1 Four wheel, articulated steer, four wheel drive, operator front.

7.2.2.2 Four wheel, articulated steer, four wheel drive, operator rear.

8. **Excavator Definition**—A mobile machine which has an upper structure capable of continuous rotation and which digs, elevates, swings, and dumps material by action of the boom, the arm, or telescoping boom and the bucket. Not included are crane-type machines and their attachments (that is, cable clam, dragline, pile driver, logging equipment, etc.)

NOTE—Undercarriage variations are applicable to all excavation types. Some examples are shown in the reference figures.

8.1 **Hoe**—An excavator that has a pivotally attached digging tool that cuts toward the machine and generally downward. It is primarily for below ground level excavation.

8.1.1 HYDRAULIC HOE

8.1.2 CABLE HOE

8.2 **Shovel**—An excavator that has a pivotally attached digging tool or a combination pivotal, extensible digging tool, that cuts away from the machine and generally upward. It is primarily for above ground level excavation.

8.2.1 HYDRAULIC SHOVEL

8.2.2 CABLE SHOVEL

8.3 **Telescoping Boom Excavator**—An excavator that has pivotally attached digging tool, rotatable about the boom axis, that cuts toward the machine through the telescoping action of the boom. It is used primarily for excavating or grading slopes, or both, either above or below ground level.

9. **Backhoe Loader Definition**—A self-propelled machine with a main frame to support and accommodate both its rear-mounted backhoe and front-mounted loader. The machine is designed with the intention that the backhoe will normally remain in place when the machine is being used as a loader and vice versa. The backhoe digs, lifts, swings, and discharges material while the machine is stationary, normally digging below ground level with bucket motion towards the machine. When used in the loader mode, the machine loads material into the bucket through forward motion of the machine and lifts, transports, and discharges material. Backhoe loaders include the following types:

- 9.1 Front-wheel steer, rear-wheel drive (or four-wheel drive).
- 9.2 Rear-wheel steer, four-wheel drive.
- 9.3 Articulated steer, four-wheel drive.

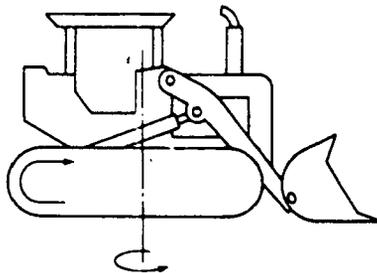


FIGURE 1—FRONT ENGINE

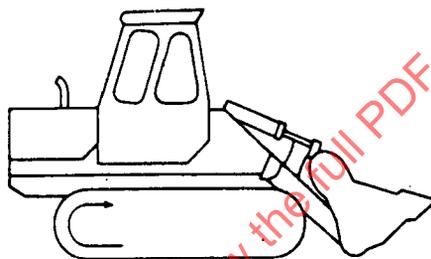


FIGURE 2—REAR ENGINE

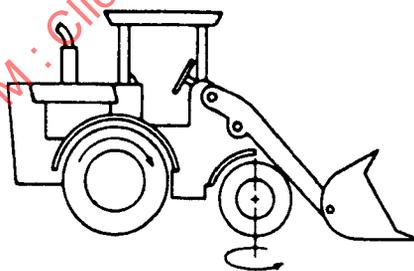


FIGURE 3—FOUR WHEEL, FRONT-WHEEL STEER, REAR-WHEEL DRIVE, REAR ENGINE

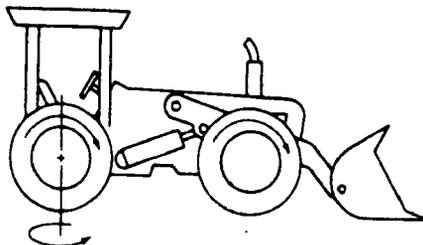


FIGURE 4—FOUR WHEEL, REAR-WHEEL STEER, FOUR-WHEEL DRIVE, FRONT ENGINE

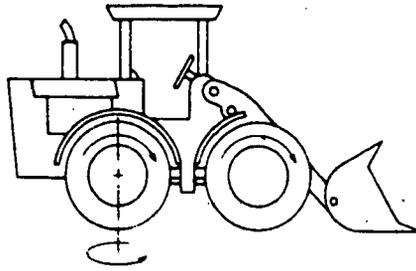


FIGURE 5—FOUR-WHEEL, REAR-WHEEL STEER, FOUR-WHEEL DRIVE, REAR ENGINE

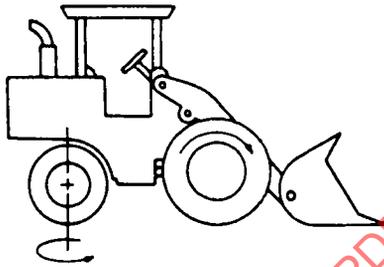


FIGURE 6—THREE WHEEL, REAR-WHEEL STEER, FRONT-WHEEL DRIVE

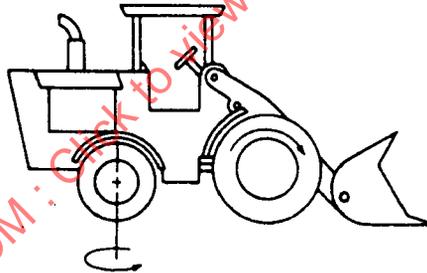


FIGURE 7—FOUR WHEEL, REAR-WHEEL STEER, FRONT WHEEL DRIVE

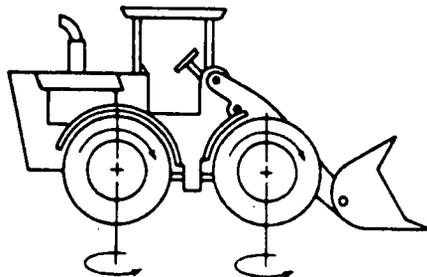


FIGURE 8—FOUR WHEEL, FRONT- AND REAR-WHEEL STEER, FOUR-WHEEL DRIVE

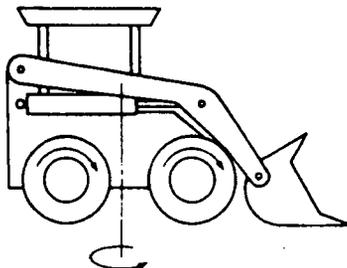


FIGURE 9—FOUR WHEEL, SKID STEER, FOUR-WHEEL DRIVE

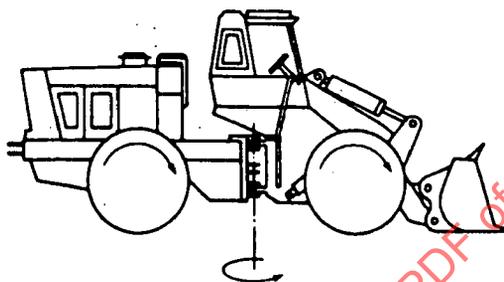


FIGURE 10—FOUR WHEEL, ARTICULATED STEER, FOUR-WHEEL DRIVE, OPERATOR FRONT

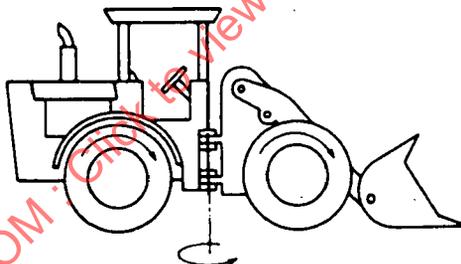


FIGURE 11—FOUR WHEEL, ARTICULATED STEER, FOUR-WHEEL DRIVE, OPERATOR REAR

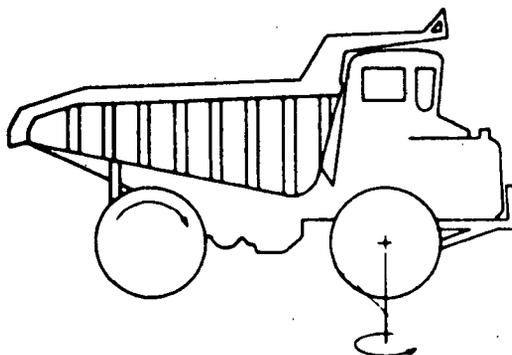


FIGURE 12—TWO AXLES, REAR-AXLE DRIVE

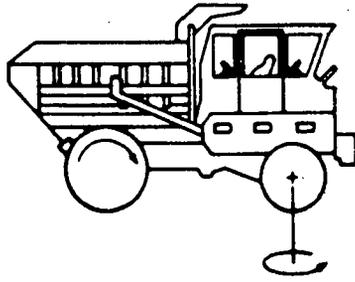


FIGURE 13—TWO AXLES, REAR-AXLE DRIVE, TWO-WAY SEAT AND CONTROLS

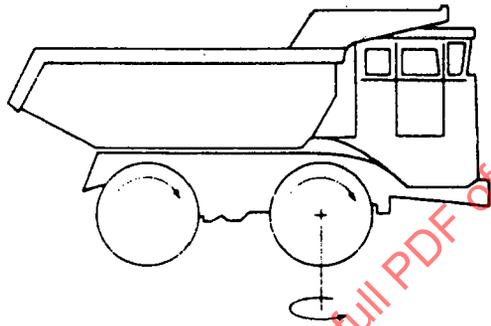


FIGURE 14—TWO AXLES, TWO-AXLE DRIVE

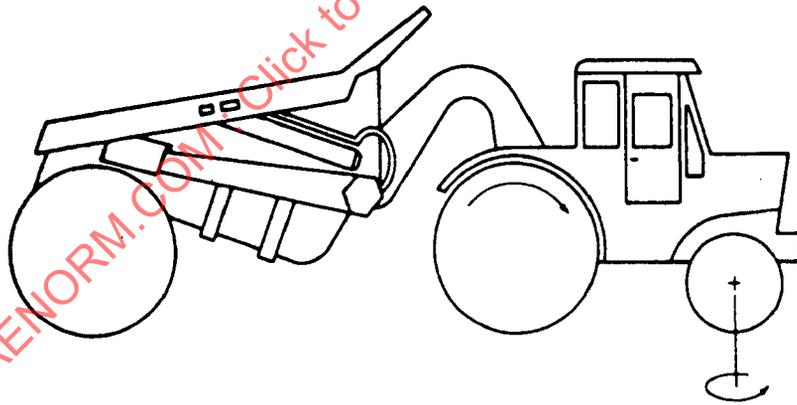


FIGURE 15—THREE AXLES, CENTER-AXLE DRIVE

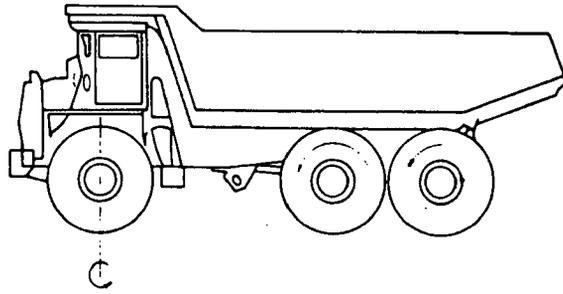


FIGURE 16—THREE AXLES, CENTER- AND REAR-AXLE DRIVE

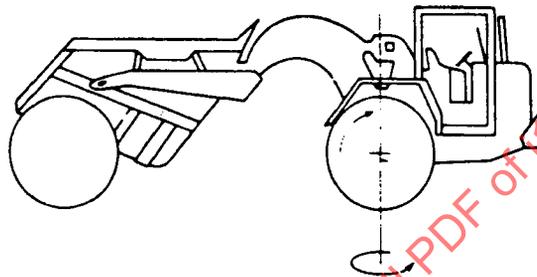


FIGURE 17—TWO AXLES, FRONT-AXLE DRIVE

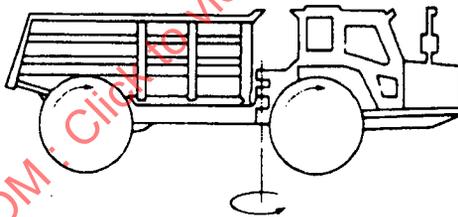


FIGURE 18—TWO AXLES, TWO-AXLE DRIVE

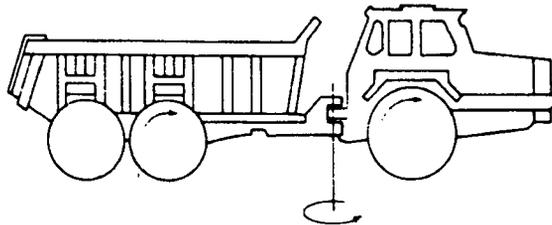


FIGURE 19—THREE AXLES, FRONT- AND CENTER-AXLE DRIVE

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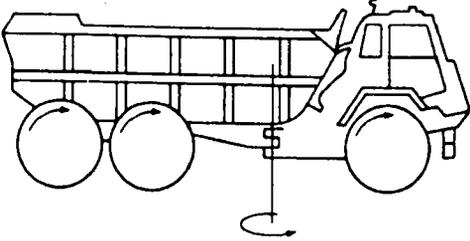


FIGURE 20—THREE AXLES, ALL DRIVE

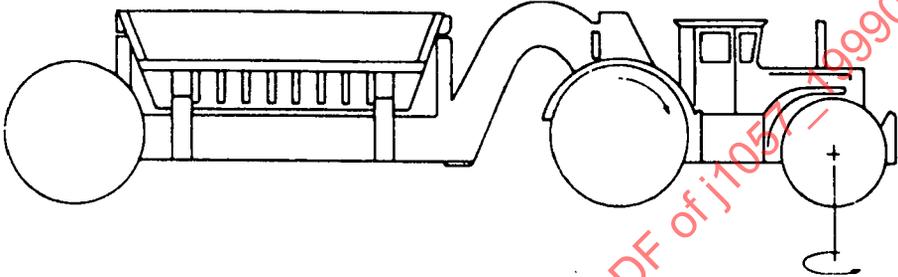


FIGURE 21—THREE AXLES, CENTER-AXLE DRIVE

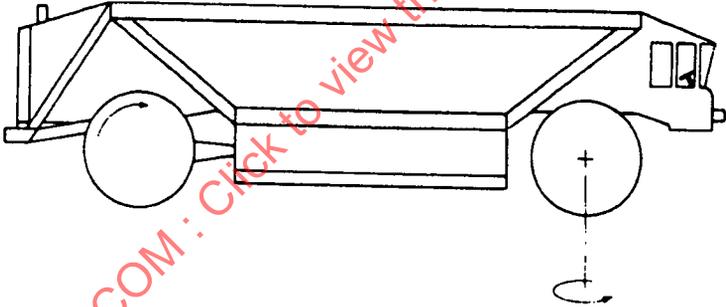


FIGURE 22—TWO AXLES, REAR ENGINE AND DRIVE

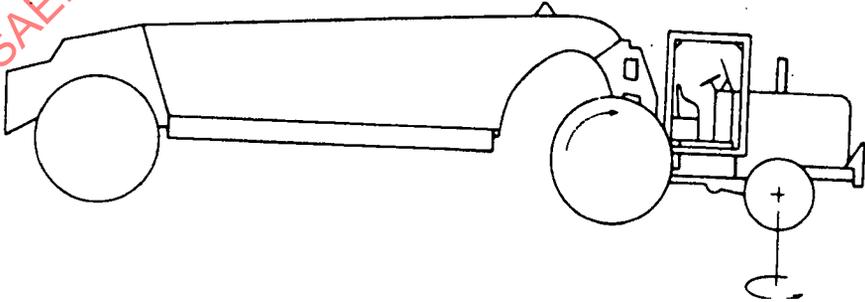


FIGURE 23—THREE AXLES, CENTER-AXLE DRIVE

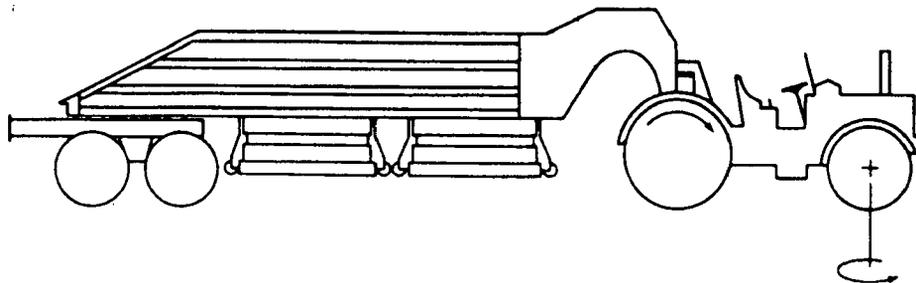


FIGURE 24—FOUR AXLES, SINGLE-AXLE DRIVE, TANDEM TRAILING AXES

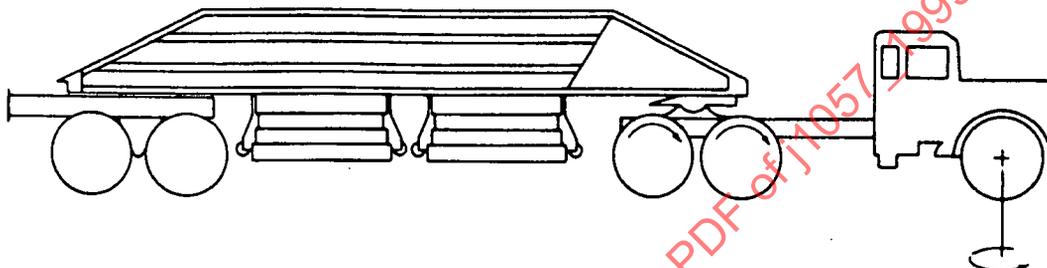


FIGURE 25—FIVE AXLES, TANDEM-AXLE DRIVE, TANDEM TRAILING AXLES

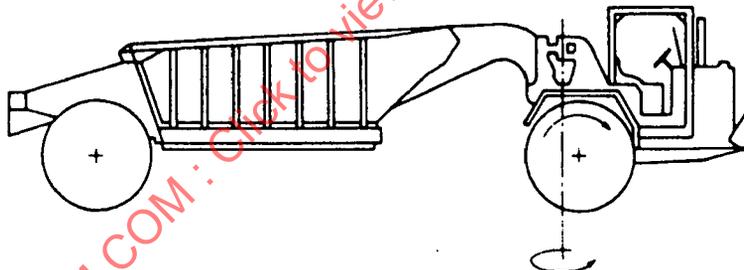


FIGURE 26—TWO AXLES, FRONT-AXLE DRIVE

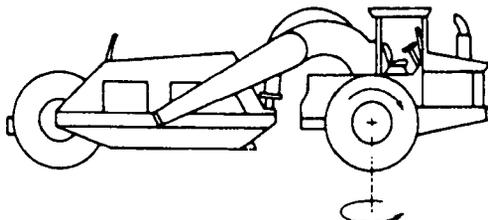


FIGURE 27—TWO AXLES, ARTICULATED STEER, FRONT-AXLE DRIVE

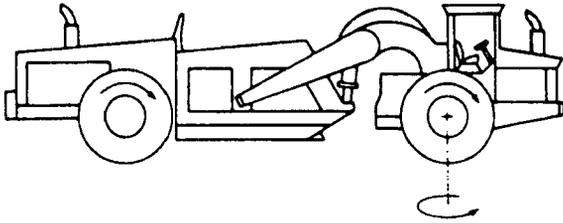


FIGURE 28—TWO AXLES, ARTICULATED STEER, TWO-AXLE DRIVE

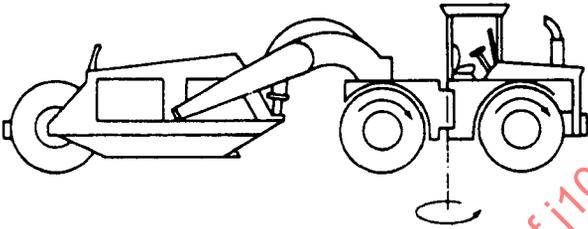


FIGURE 29—THREE AXLES, ARTICULATED STEER, FRONT- AND CENTER-AXLE DRIVE  
(ARTICULATED TRACTOR OR FOUR-WHEEL STEER TRACTOR)

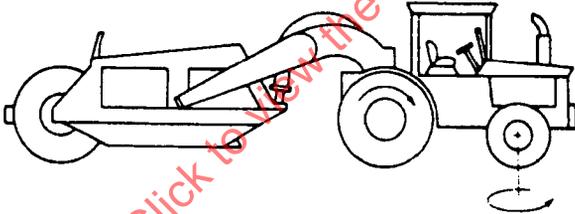


FIGURE 30—THREE AXLES, FRONT-WHEEL STEER, CENTER-AXLE DRIVE

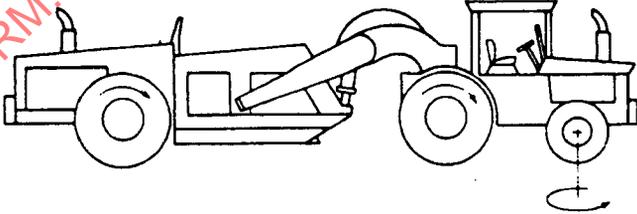


FIGURE 31—THREE AXLES, FRONT-WHEEL STEER, CENTER- AND REAR-AXLE DRIVE

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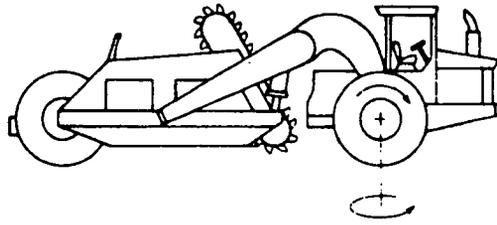


FIGURE 32—TWO AXLES, ARTICULATED STEER, FRONT-AXLE DRIVE

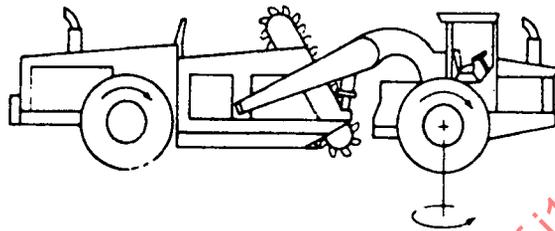


FIGURE 33—TWO AXLES, ARTICULATED STEER, TWO-AXLE DRIVE

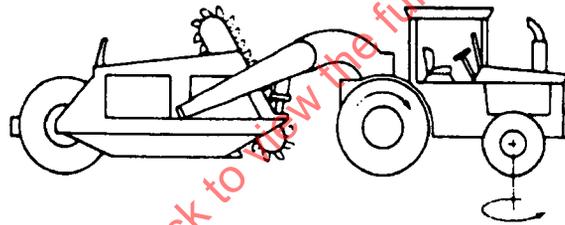


FIGURE 34—THREE AXLES, FRONT-WHEEL STEER, CENTER-AXLE DRIVE

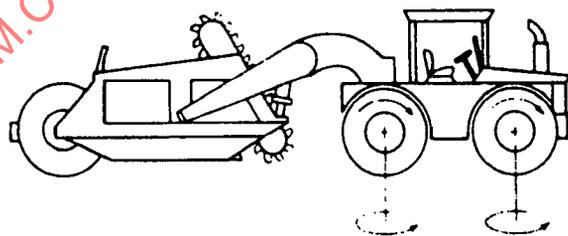


FIGURE 35—THREE AXLES, ARTICULATED STEER, FRONT- AND CENTER-AXLE DRIVE  
(ARTICULATED TRACTOR OR FOUR-WHEEL STEER TRACTOR)

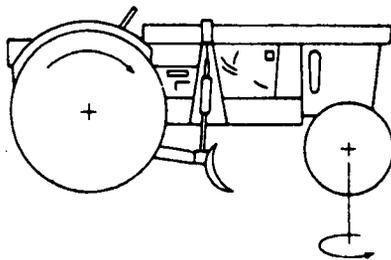


FIGURE 36—FOUR WHEEL, FRONT-WHEEL STEER, TWO-WHEEL DRIVE (FRONT ENGINE)

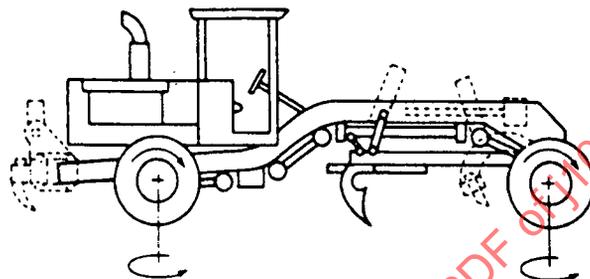


FIGURE 37—FOUR WHEEL, FRONT- AND REAR-WHEEL STEER, FOUR-WHEEL DRIVE

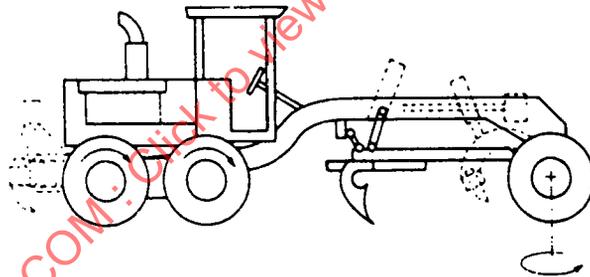


FIGURE 38—SIX WHEEL, FRONT-WHEEL STEER, FOUR-WHEEL DRIVE

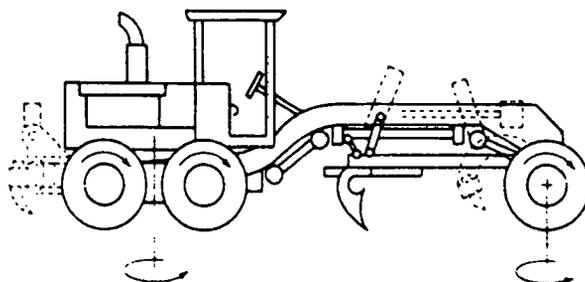


FIGURE 39—SIX WHEEL, FRONT-WHEEL AND REAR BOGIE STEER, SIX-WHEEL DRIVE

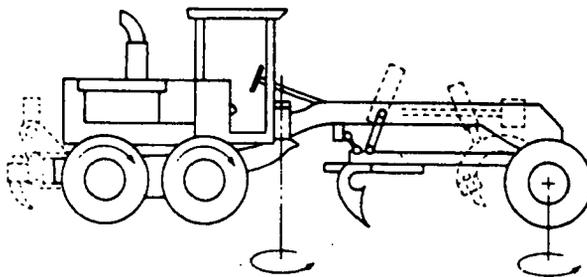


FIGURE 40—SIX WHEEL, FRONT-WHEEL AND ARTICULATED STEER, FOUR-WHEEL DRIVE

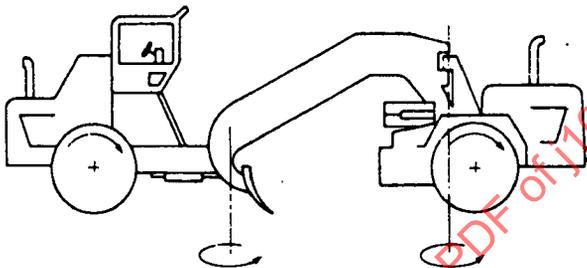


FIGURE 41—FOUR WHEEL, DOUBLE ARTICULATED STEER, FOUR-WHEEL DRIVE

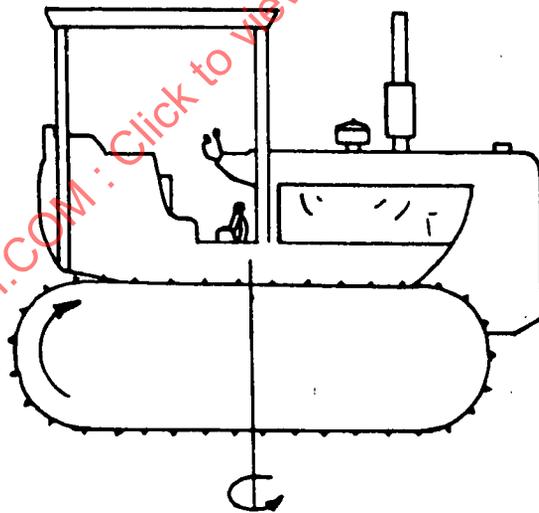


FIGURE 42—CRAWLER TRACTOR