

Initial phase of building execution

---

# Machines

---

# for area excavation

Building technology



Building technology

## Choice of excavation technology

Ascertaining properties

**Properties of soil & rocks**

**Spatial properties**

Situation of excavation

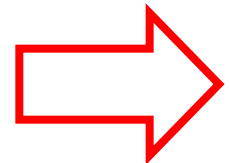
**Operations needed**

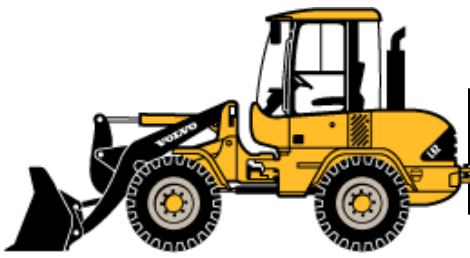
**Area digging**

Machine moves in excavation  
depth at max. 1m  
Top soil removing, rough terrain arrangement

ploughing – eroding

**Transport**



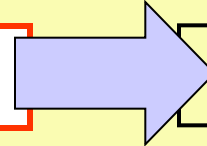


Building technology

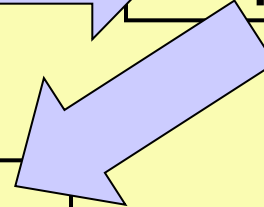
## Choice of digging technology

### Area excavation

Properties of soil

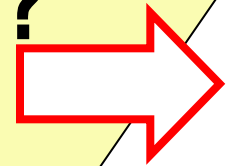


operations needed



ploughing - disintegration

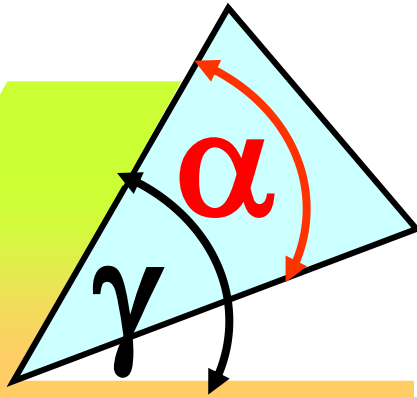
What ?





# Basic shapes of tools

## Horizontal knife (edge)

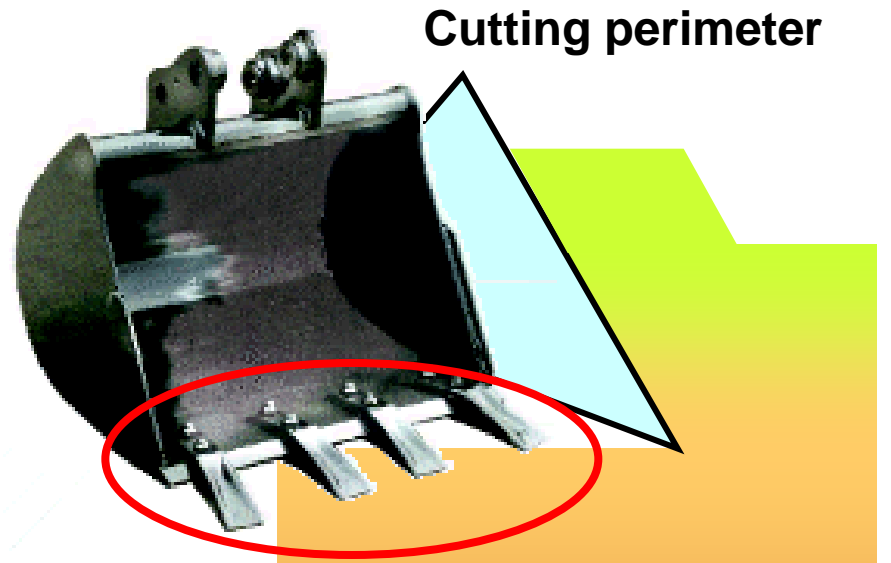


$\alpha$

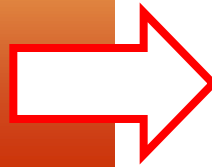
edge angle  
 $20^{\circ} - 30^{\circ}$

$\gamma$

angle of cutting  
(minimum)



With teeth





Building technology

# Basic types of instruments

soil  
disintegrated

ripping

**Disintegration + shove - removing**

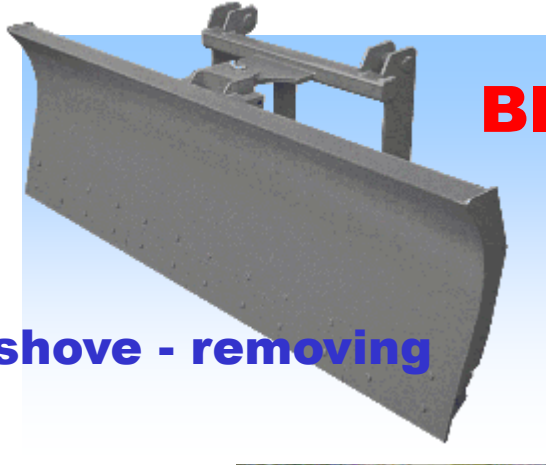
rock  
disintegrated

by ripping

fragmentation

blast

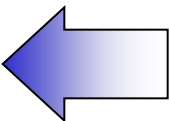
**shove**



**Blade**

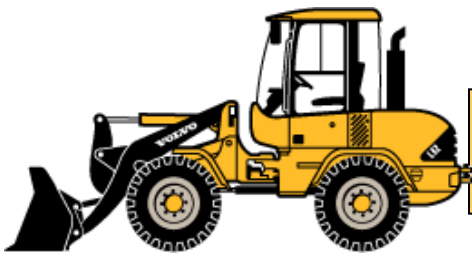


**Edge**



**Horizontal moving**

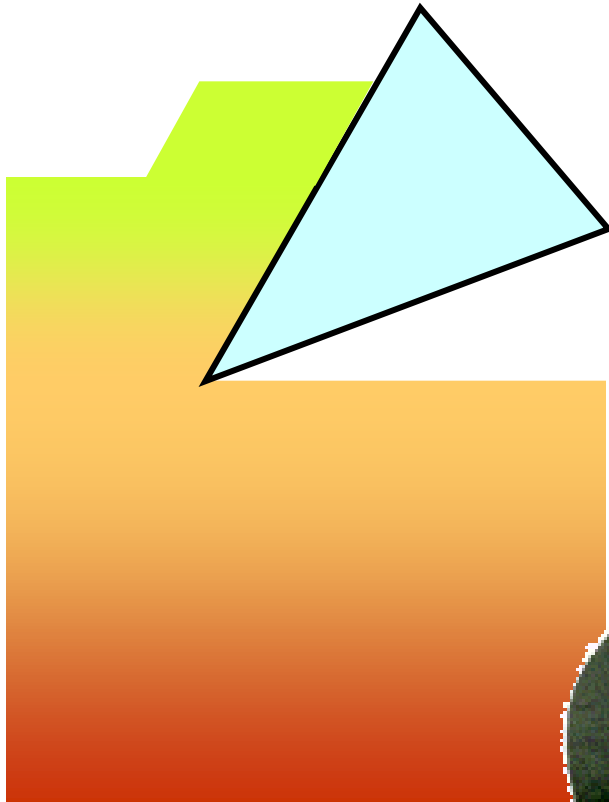




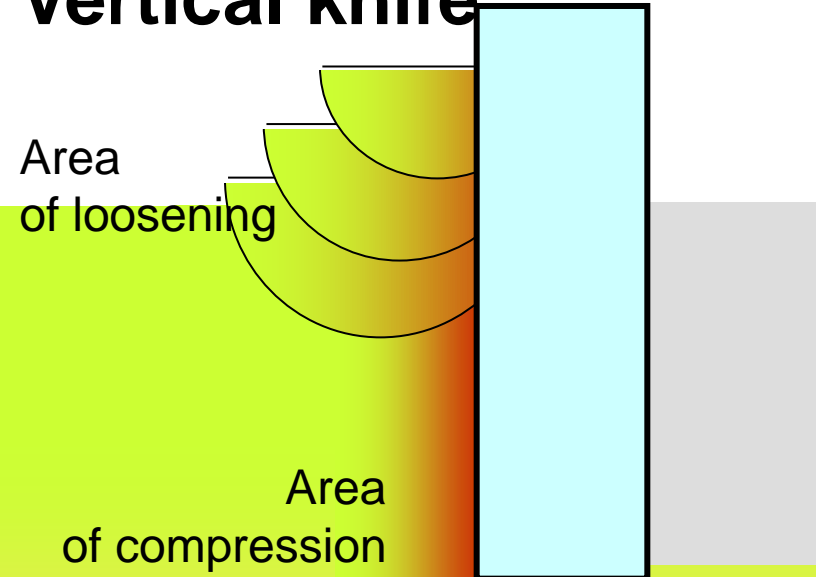
Building technology

## Basic shape of instruments

### Horizontal knife



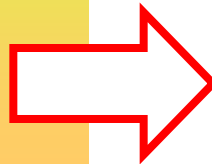
### Vertical knife



Area  
of loosening

Area  
of compression

**Cutting edge**  
of shovel with teeth



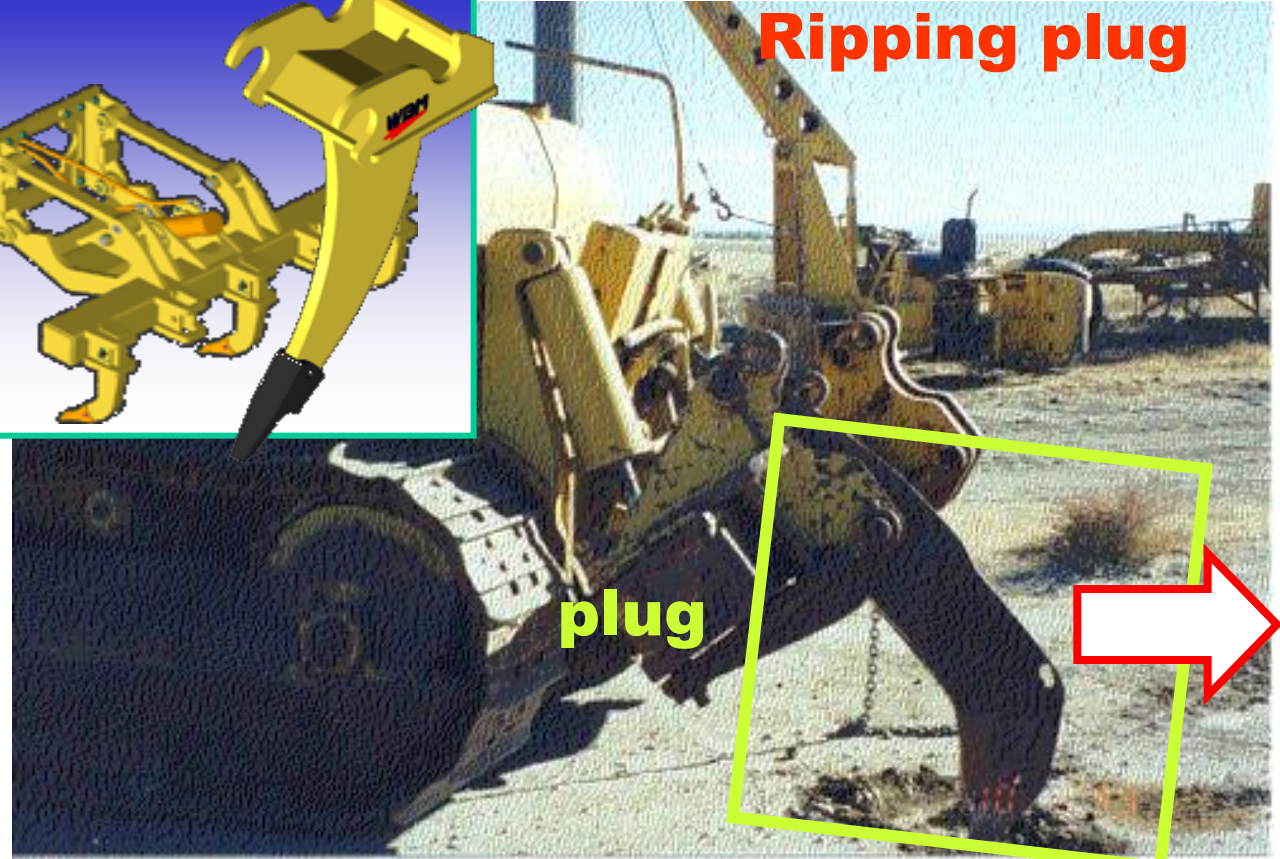


Building technology

# Basic shape of instruments

Soil disintegrated  
by ripping

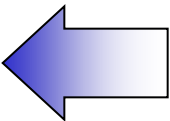
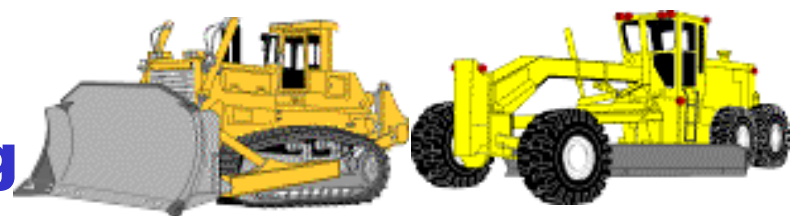
rock disintegrated  
by ripping  
fragmentation  
blast  
**ripping**



**Ripping plug**

**plug**

**Horizontal moving**





Building technology

## Choice of mechanisation

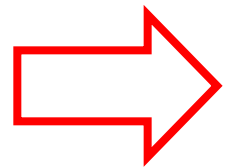
### Shallow digging

operations needed

disintegration, ripping

Transport

Very short  
short  
average  
long







## Building technology

# Dozer

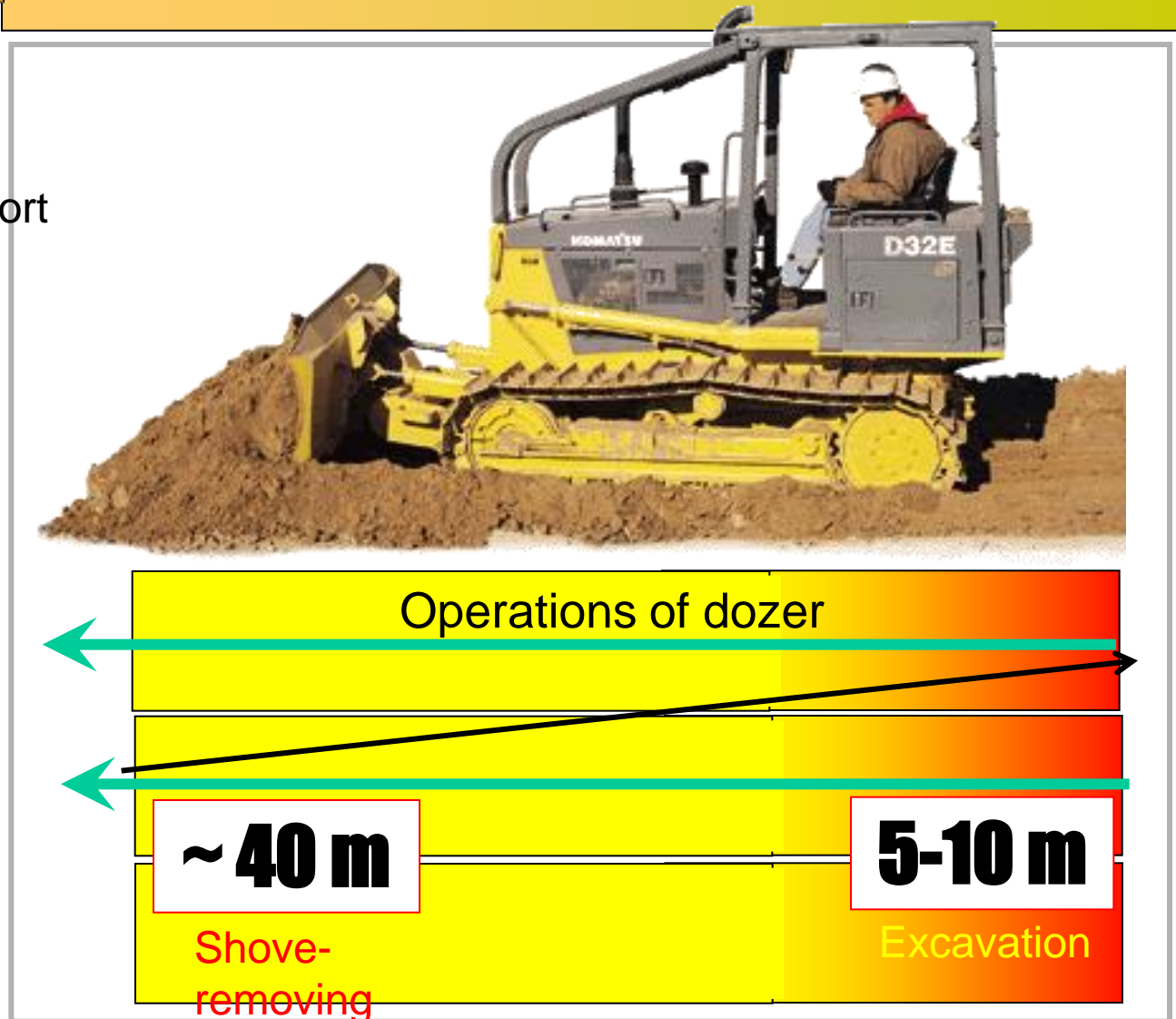
Dozer:  
Disintegration & transport  
for very short

**10-30 m**

& short  
distances

**30-90 m**

Ripping  
Terrain cleaning  
Backfilling



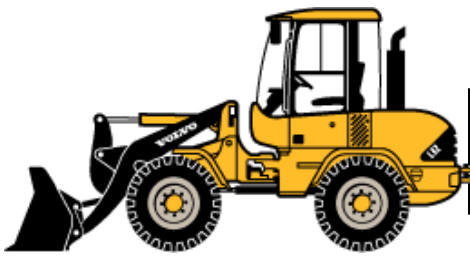
Operations of dozer

**~ 40 m**

Shove-  
removing

**5-10 m**

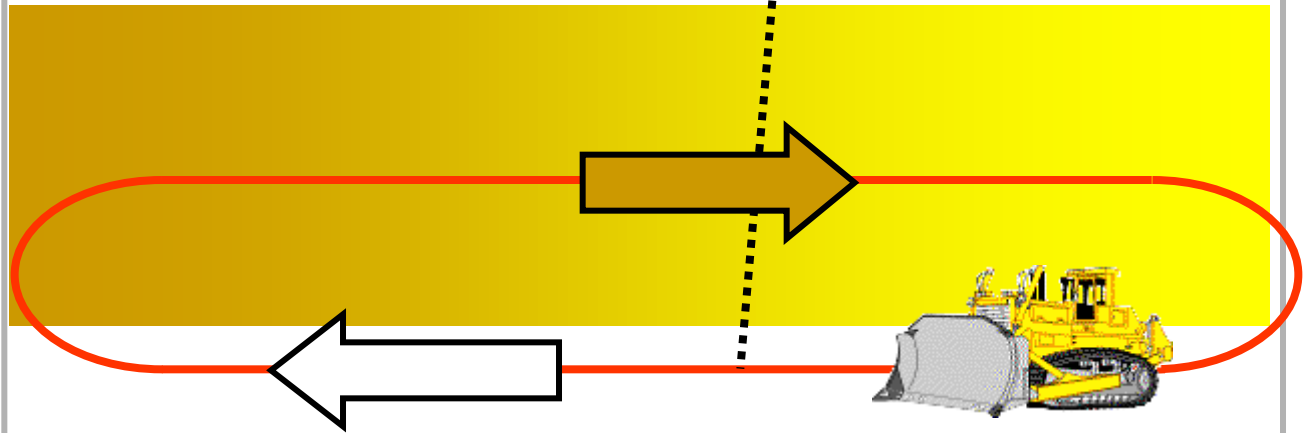
Excavation



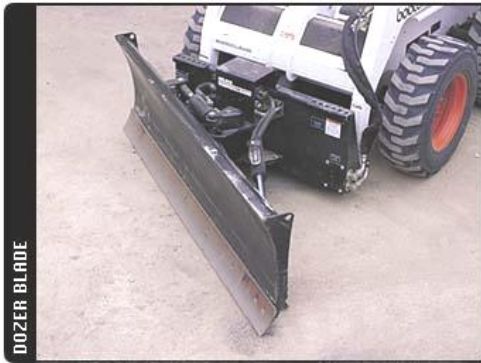
Earthwork

# Dozer – terrain cutting

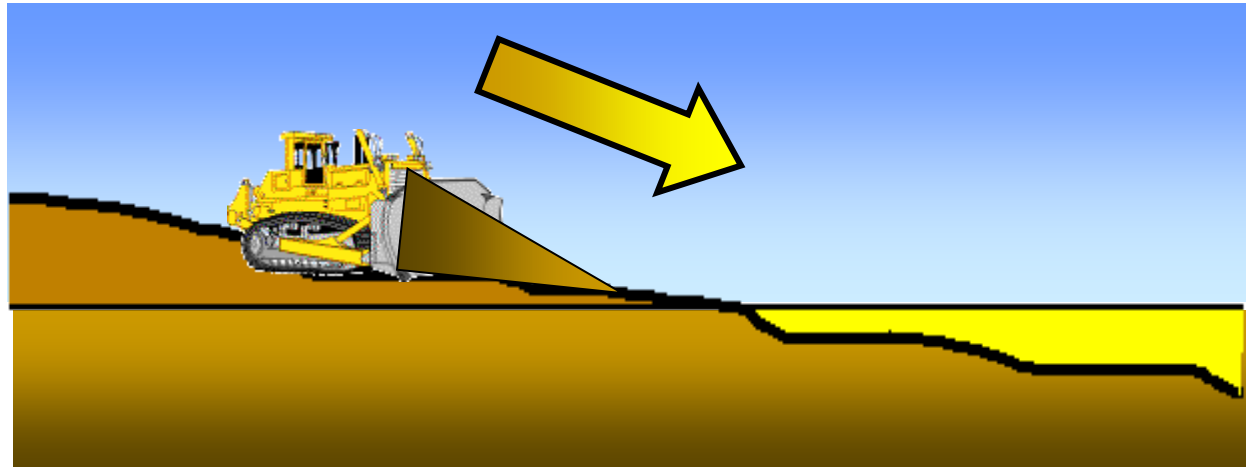
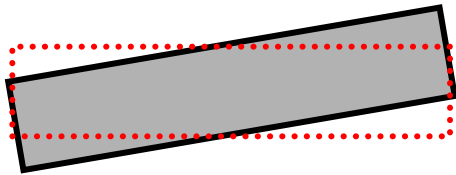
Work with rotation

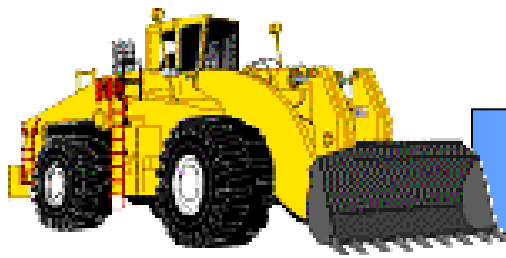


bulldozer  
angle dozer



tilt dozer





Area earthwork

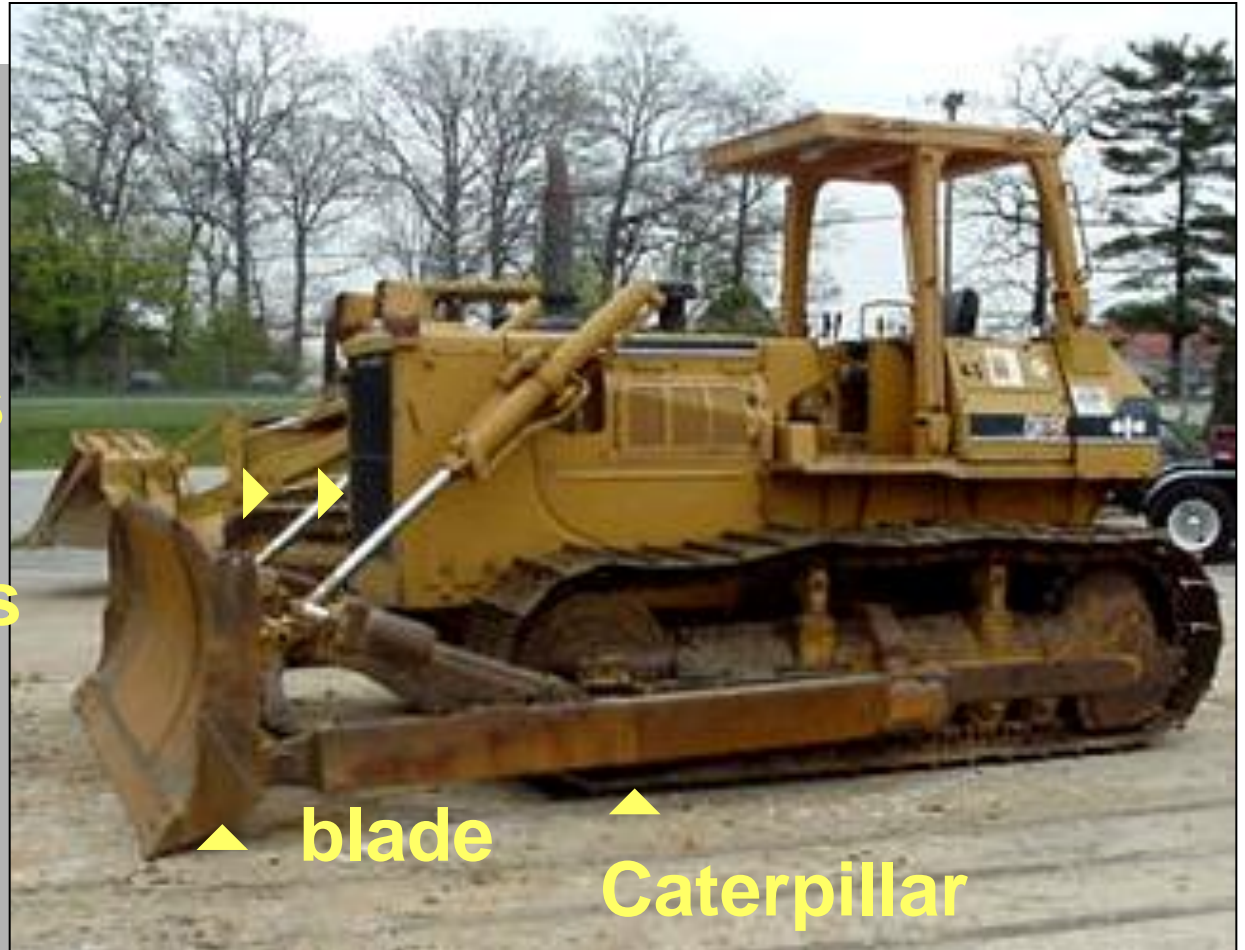
Dozer

hydro-engines

Elevation of blade

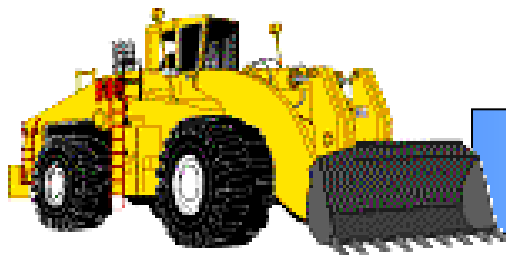
Hydro-engines

Change of tilt ▲



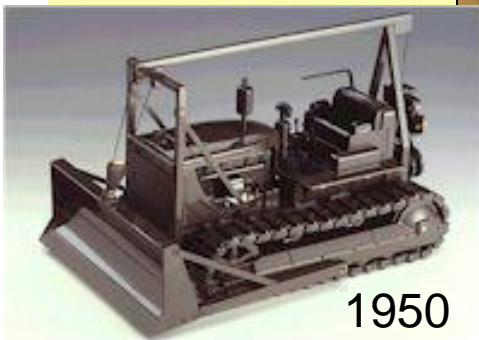
▲ blade

▲ Caterpillar



## Earthwork

Dozer – hydro-engines controlling blade



1950  
Cable-operated



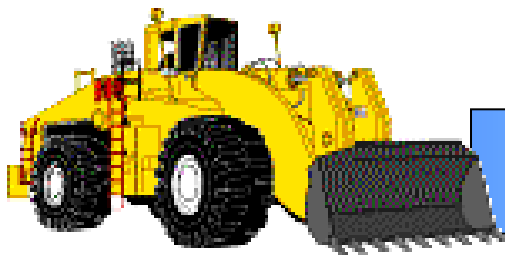
Earthwork

## Top soil removing

Top soil  
removing  
**dozer**

Top soil shoved in  
heaps





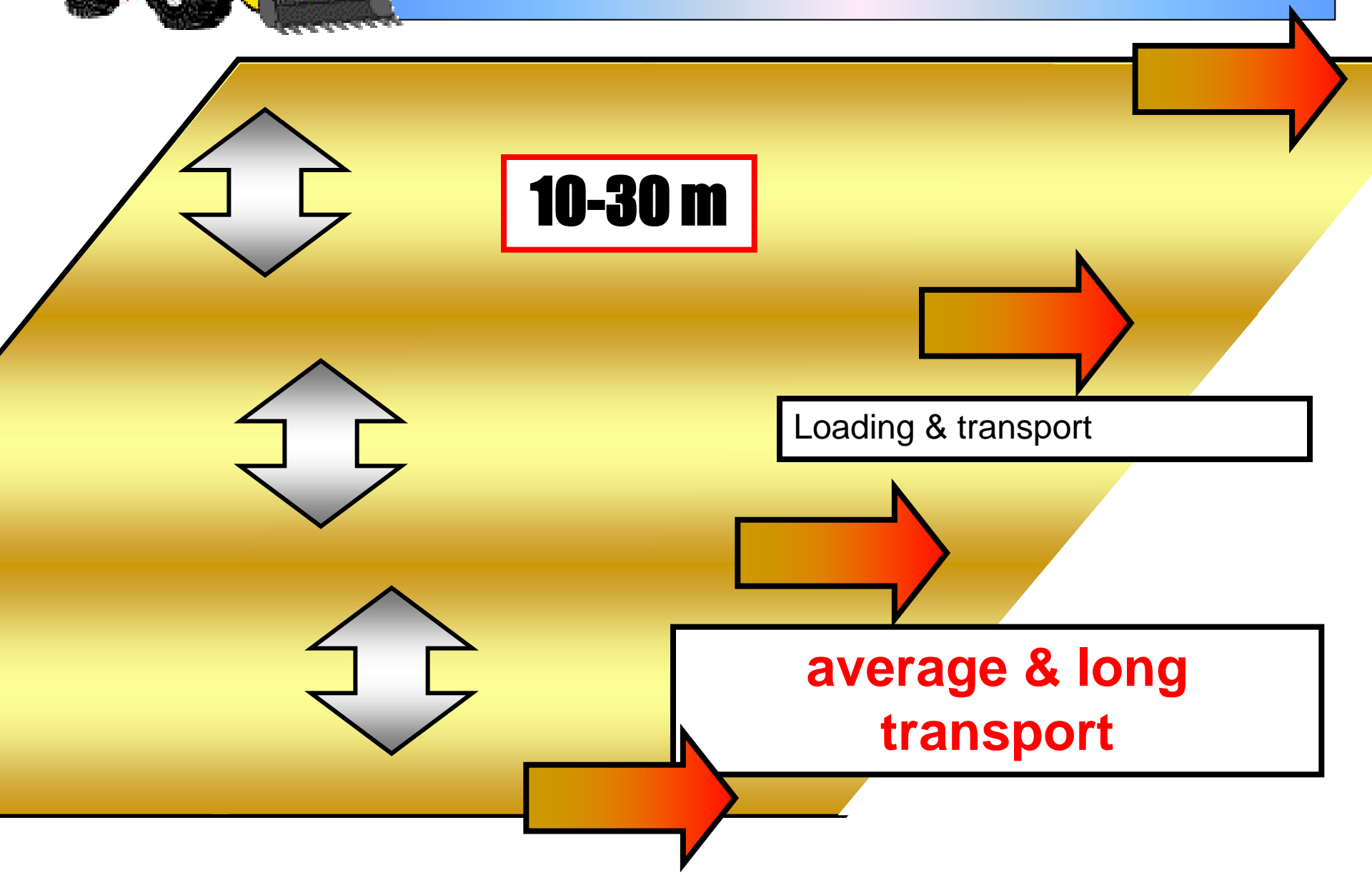
Earthwork

Shove off in heaps

**10-30 m**

Loading & transport

**average & long  
transport**





## Earthwork

# Basic tools of loading shovel

soil  
disintegrated  
by ripping

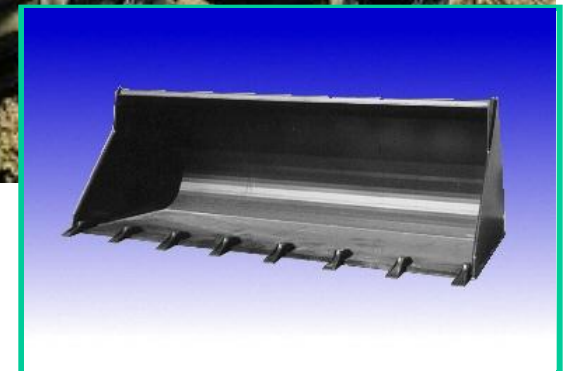
**disintegration +  
loading +  
transport**

rock  
disintegrated  
by ripping  
fragmentation  
blast

**loading +  
transport**

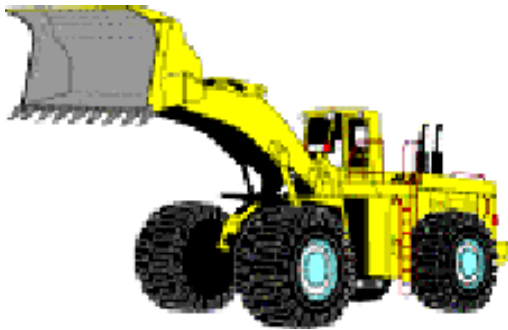
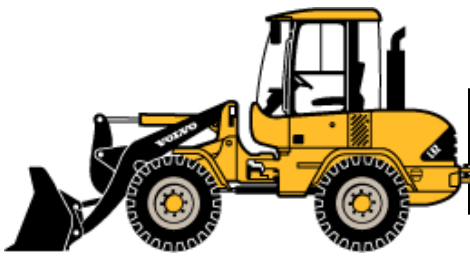


**Loading  
shovel**



Earthwork

# Wheeled loading shovel



**Horizontal move of machine**  
**Vertical move of tool**





Earthwork

## Tracked loading shovel

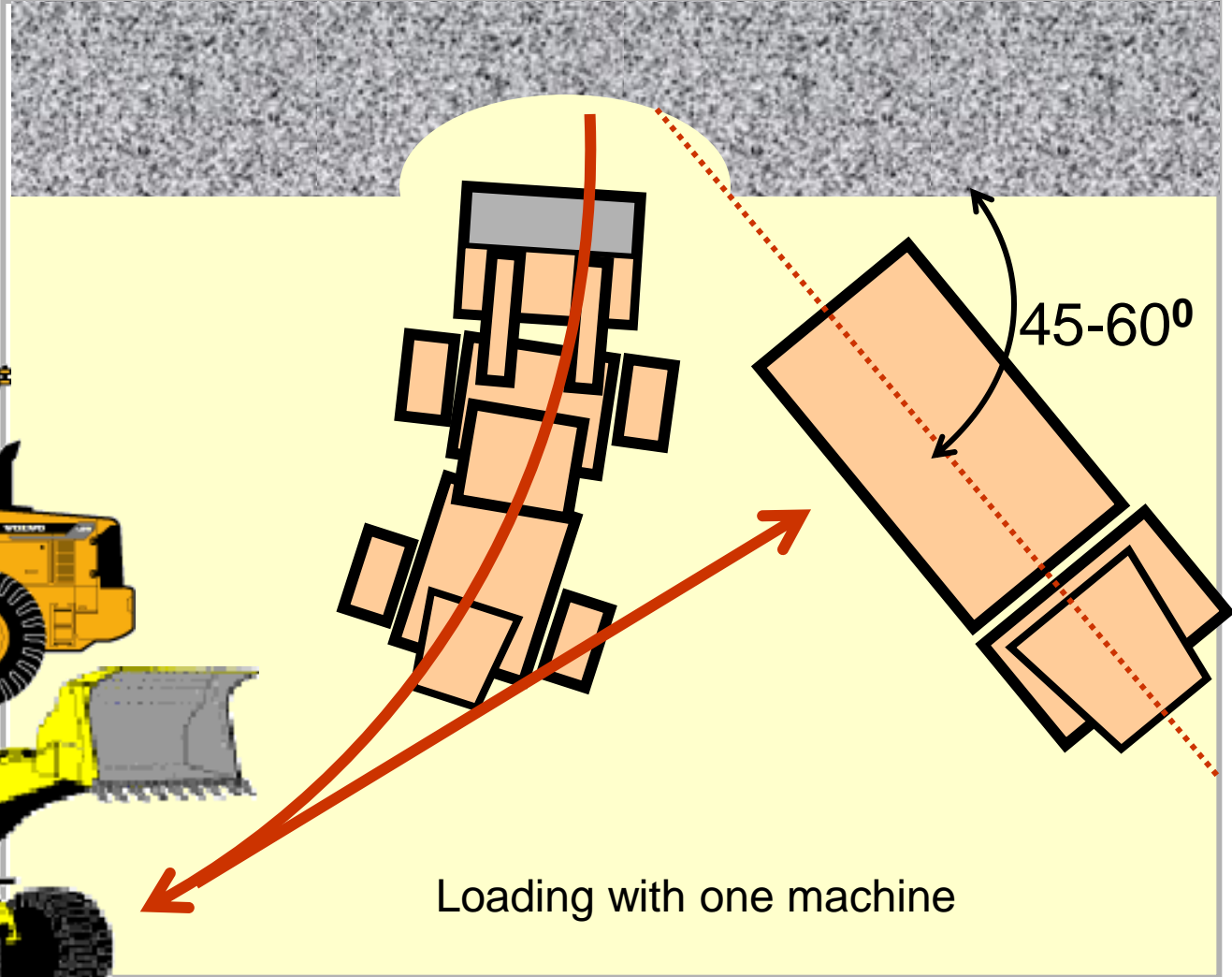
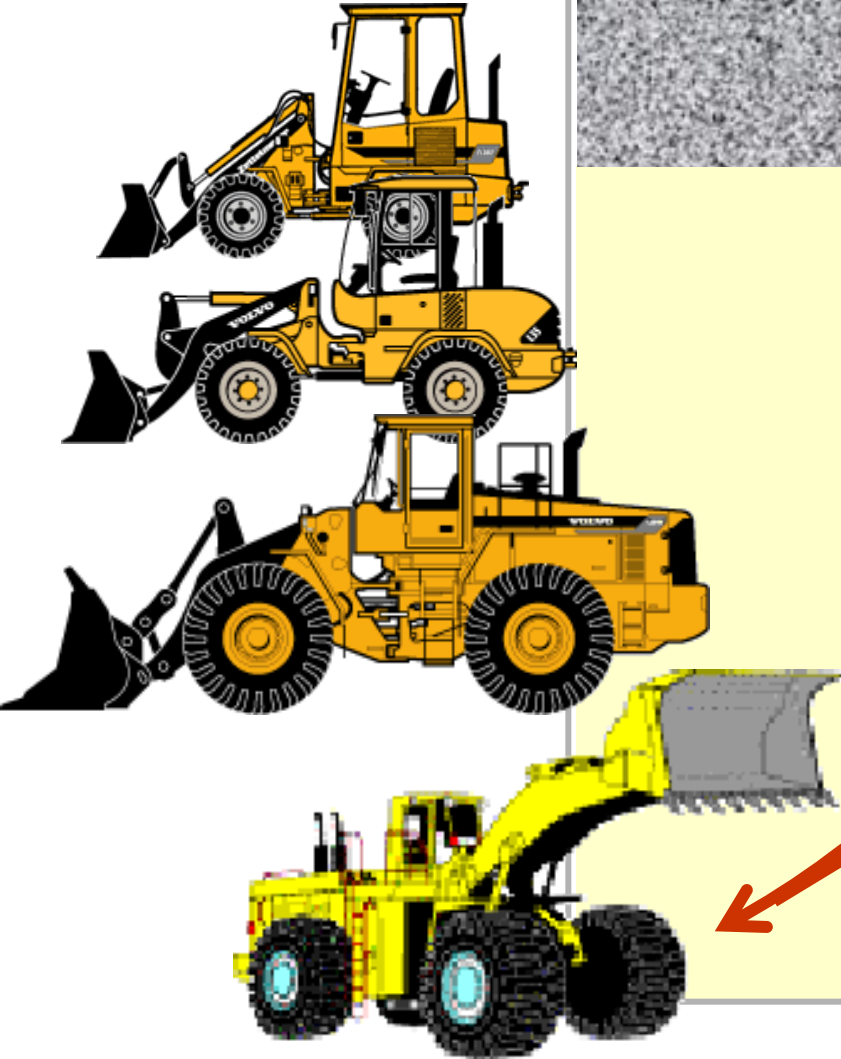
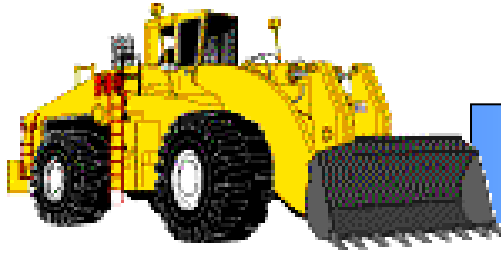


**Don't interchange  
shovel with  
blade !**



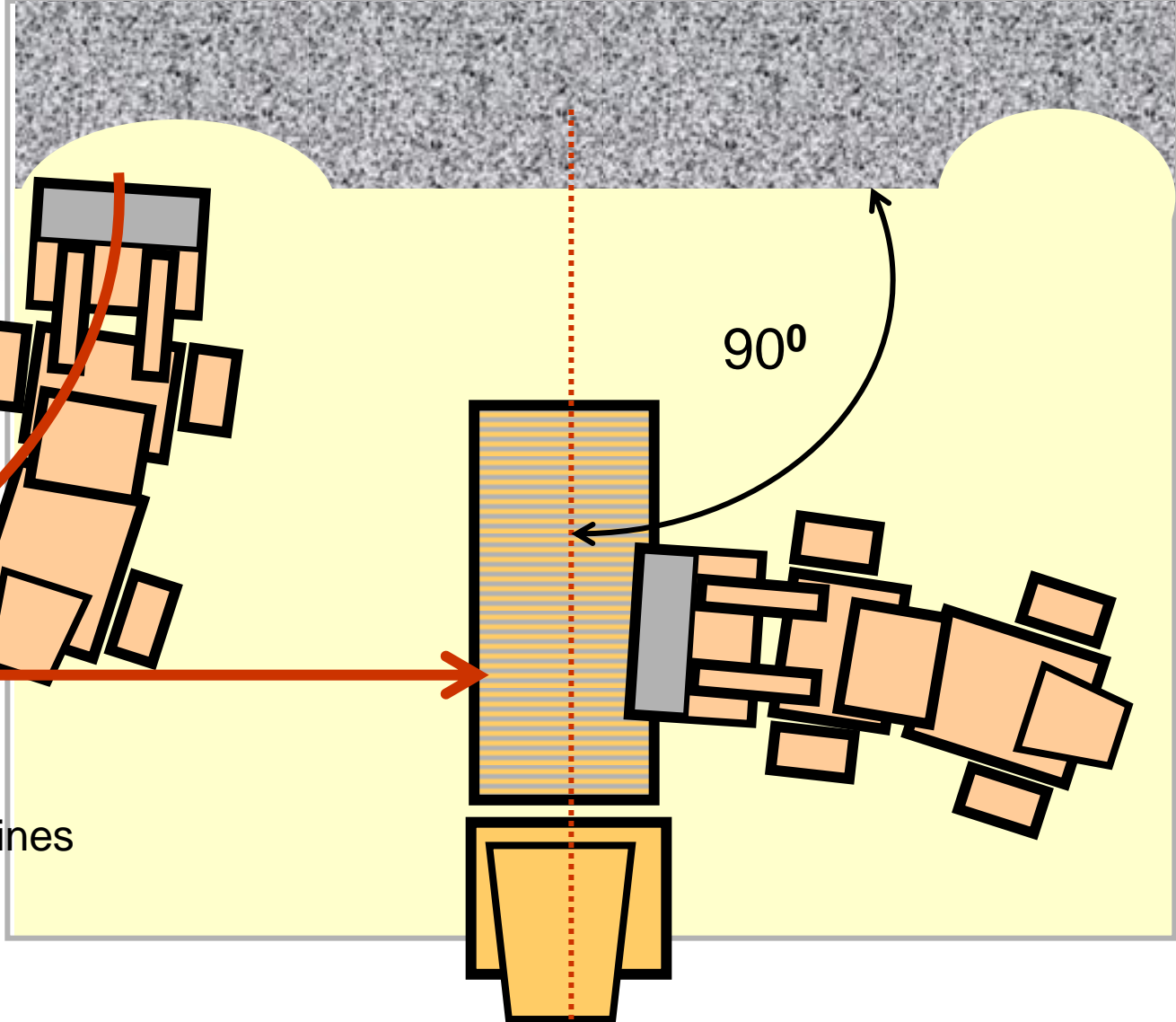
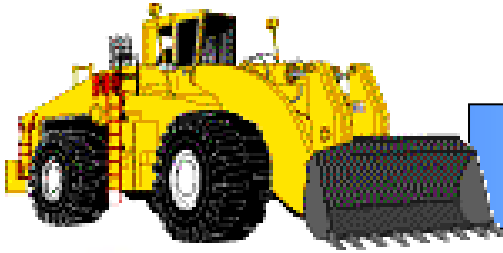
# Earthwork

## Face loading shovel



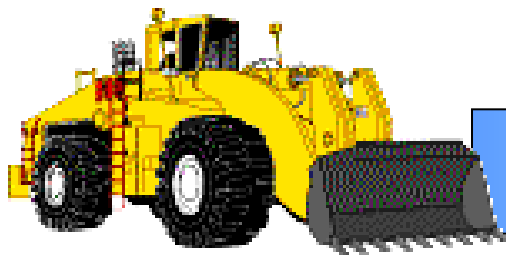
# Earthwork

## Face loading shovel



Loading with two machines





Earthwork

## Excavation with loading shovel



**CATERPILLAR**

# LIEBHERR