



# Equipment Issues & Best Practices in a Landfill Application

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**Ring Power™**



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# What Is the Highest Cost of Operating a Sanitary Landfill?



**Equipment Concerns & Issues**

**2019 SWANA FL  
Summer Conference**

July 28-30 | Grand Hyatt Tampa Bay

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# Machine Selection



- **Choosing the Correct Machine**
  - **Waste Handling & Compaction**
  - **Soil / Cover Material Handling**
    - Excavation, Loading, Hauling, Spreading
  - **Support / Maintenance**
    - Roads, Slopes, Trenching, Channeling, Constructing, Dust Control, etc...

# The Problems of...

- Machine **Failures**
- **High** Operation costs
- **Inefficient** landfill operation

***WILL increase when machines...***



- are not the right **type**
- are not **sized** correctly
- are **Not Reliable!**



# Shortcutting on costs

- **Cost cutting on machine selection at startup**
  - Landfill filling up too fast
  - High O&O costs
  - Poor reliability
- **HUGE implications of this as apposed to getting the correct machines at the start of the project?**

# Primary Purpose of a Landfill Compactor



**To obtain the highest density possible for the type of material being compacted**

- **Landfill Compactors**
  - Compress and shred better
  - Are designed to limit material rebound when utilized correctly on passes and patterns
  - Designed for highest area coverage in shortest amount of time

*Not as easy to spread with blade design*

# Compaction Equipment ??

- Basics of COMPACTION?
  - Spread the layers thin
  - Run over the trash multiple times



# Primary Purpose of Dozer



**To quickly move material from the truck unload to the work face**

- **Pushing material to working face**
  - **Spreading the material into thin layers**
  - **Cover**
    - Soils, ADC / Tarp deployment
  - **Utility work**
    - Road maintenance, slope remediation
- **Dozers**
    - Move material faster over a longer distance
    - Layer more evenly
    - Have better traction on slopes
    - Have a lower visual reference to the layer, thus thinner layering

**DOZER Efficiency**



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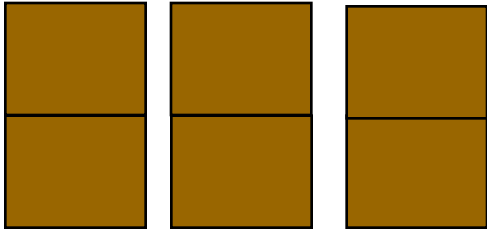
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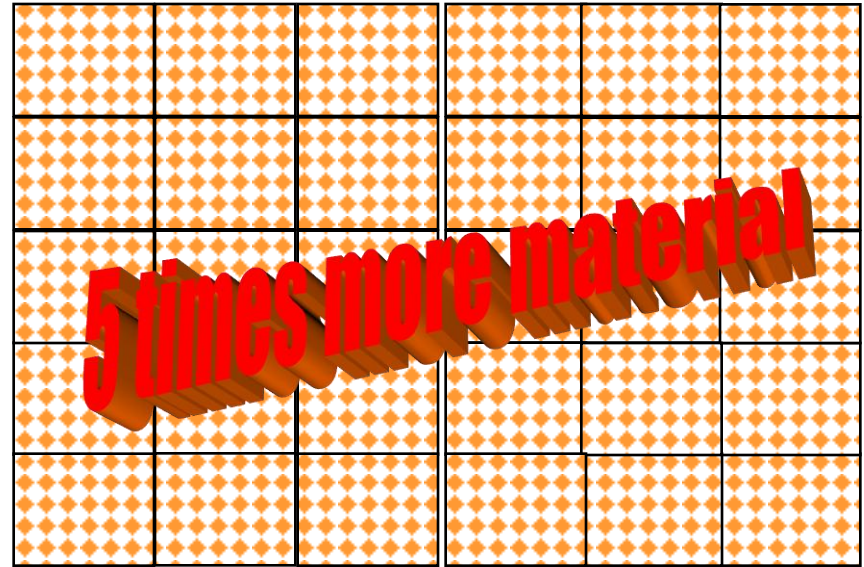


# Waste & Soil are Totally Different

- 7 Tons of dirt
- Dry packed earth – 2275 lb/yd<sup>3</sup>
- = 6 yd<sup>3</sup> material to push



VOLUME !



- 7 Tons of waste
- Dumped onto tip floor ~ 465 lb/yd<sup>3</sup>
- = 30 yd<sup>3</sup> material to push



# Soil is different in traction

Landfill Operations

COT?

COT = .90

Dry packed earth

COT = .20 - .40

WASTE

Material Differences

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# Evaluation of Equipment Needs VARIES



- Not just one solution
  - Equipment working alone, System, Size of work area, distance push
- **All** the factors are important
  - Uphill, Load size, Peak periods, Operators, etc
- Do not make your decision in isolation
  - Discuss and Research others
    - Here, Events, Call, References, etc
- Understand what your equipment “**must**” do
  - Also what would be “*nice*” to do

**There is not one “best fit” for all applications**



# Summary

- What is 'most' important to you?
  - **Handling inbound loads quickly?**
    - Keep the trucks moving...
  - **Increase density?**
    - Keep the landfill operating...
- **Compactor Working Alone**
  - Percentage of work Compactor spent pushing & spreading
    - **65 – 70%**
  - Top 3 studies indicate (75' X 75' face with 50' push)
    - **Avg. 135 ton / hr – 836 LFC Push/Spread & Compacting**
    - **Avg. 300 ton / hr – Compacting only (TTT / LFC System, working together)**  
(numbers could be slightly lower with traffic and daily influences)
  - **Compactor compacting (smashing trash)**
    - 30 – 35% of the time on 5 different sites / 10 different studies.



# Let's Talk Tips

## What is their Purpose?



Understanding Tips on the Wheels



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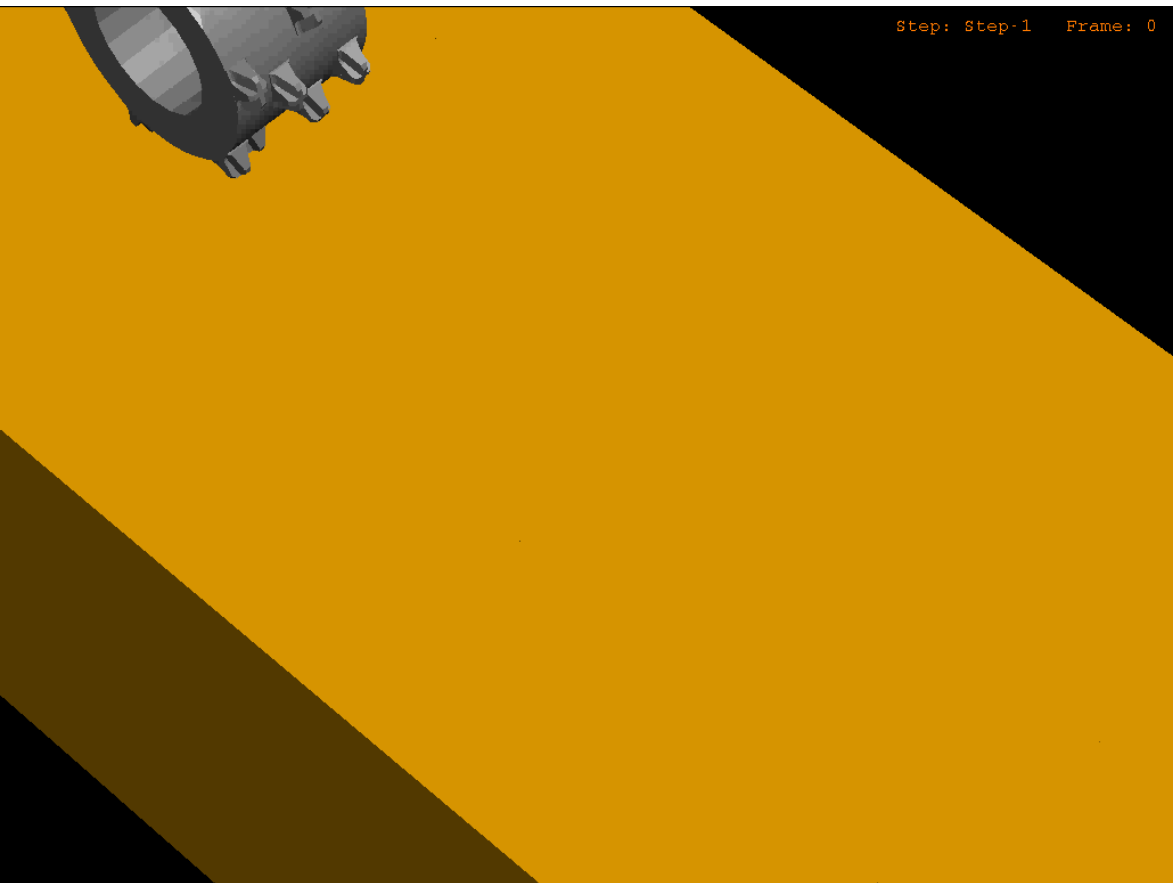
# What Differentiates Wheels & Tip Design on a Landfill Compactor?



- Designed to compliment the “MACHINE”
  - Keep the machine Productive
    - Traction
      - Keep compactor ‘moving’
        - » COMPACTION
    - Performance
      - Keep the wheels clean from plugging
        - » Puncture, Shred & Pulverize various materials
      - Keep the power where you need it
        - » As-needed cleaner finger system

# Wheels provides Compaction

- Tip Layout



- Allows wheel to sink into trash for even and thorough **COMPACTION** while maintaining TRACTION & STABILITY
  - Keeping clean

# Caterpillar Machine Configuration Simulator



Level Ground

27% Grade

120k lb



LUC 0

119k lb



LUC 0

118k lb



LUC 0

117k lb



LUC 0

116k lb



LUC 0

Time: 0.0000 sec.

Adding Weight to Machine





# Speed/Coverage Comparison



25.4 Days lost  
3031 Machine passes lost  
625 Miles lost in 2500 machine hours

Additional Weight / Lost Production



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# Landfill Operations Best Practices

Various Studies conducted around the world.

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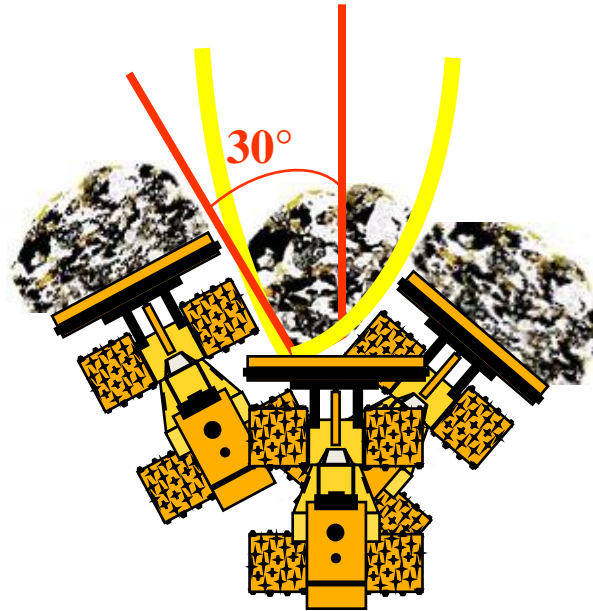


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# Dozing / Pushing

- **Avoid spills**
  - spilling means cleanup
  - straight blade
- **Sweep large loads**
  - at 30 - 45°
  - 2/3 to 3/4 blade
  - toward next sweep
  - criss-cross sweeps
  - usually 3 passes
- **Keep blade low**





# Push Distance CONSUMES Time

Too Far of Push = Need for More Equipment





# - Smooth Operation -

- Plan travel distances

- heavy flow =  
shorter distances
- face size  
(be careful!)

- Run even patterns

- Keep uniform face

- blend material
- spotter guides placement

Flow

Distance



more time = more distance



less time = less distance



# Importance of THICKNESS or Layer

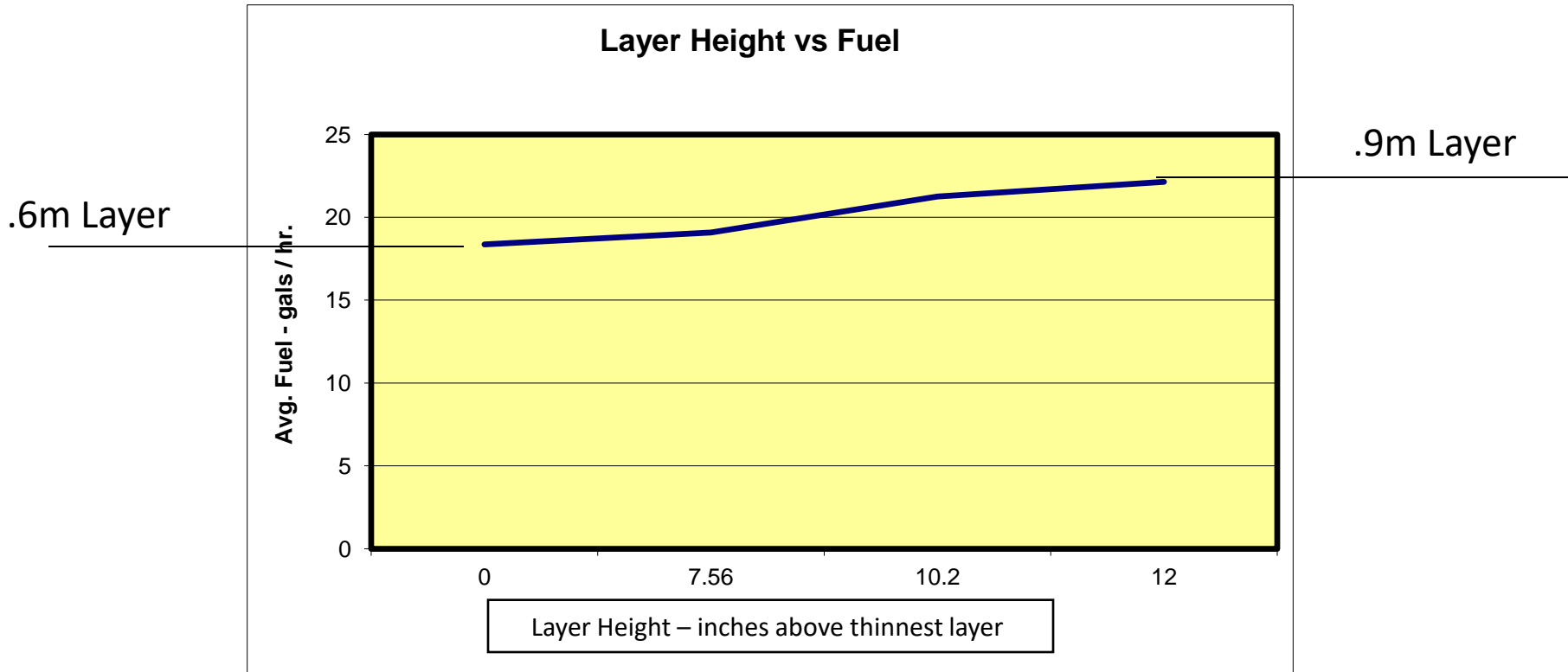
- More fuel
- More heat
- More damage / maintenance
- **MORE WORK FOR THE OPERATOR!**

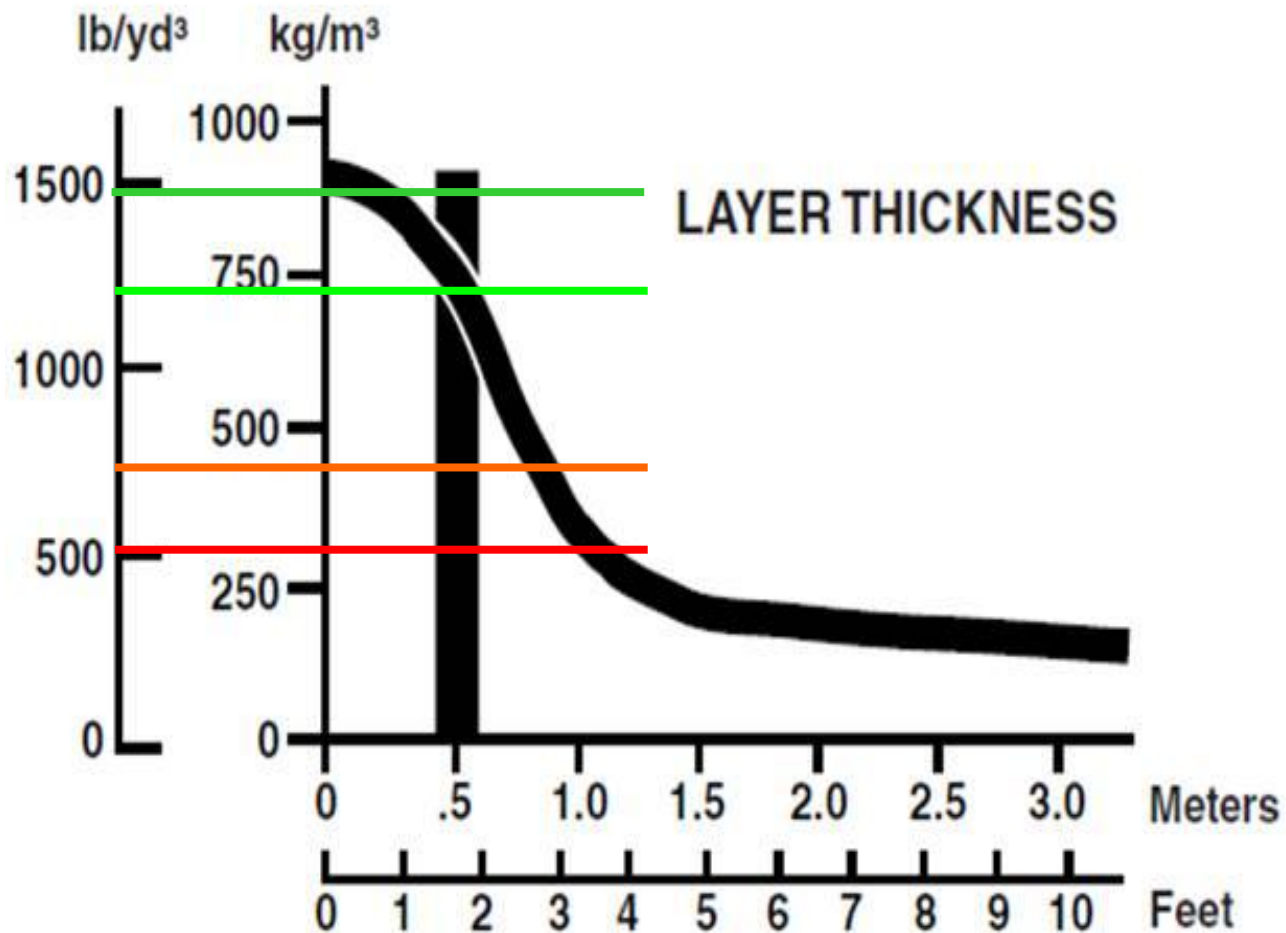
**VS**

- Faster cycles
- Greater efficiency
- Less machine damage

# Layer Height

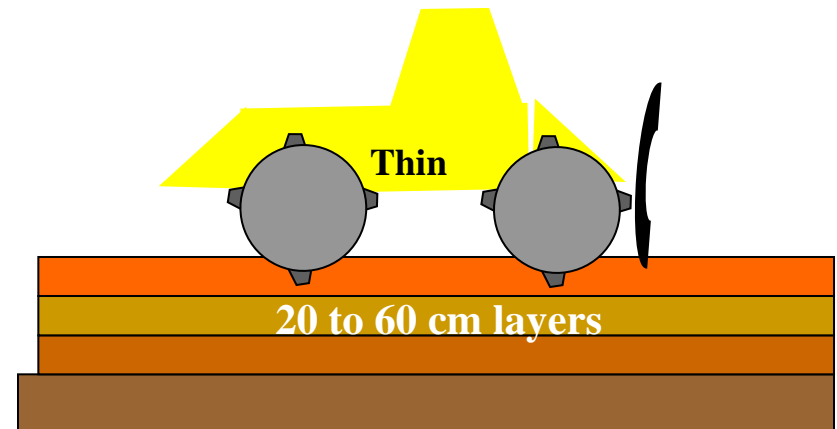
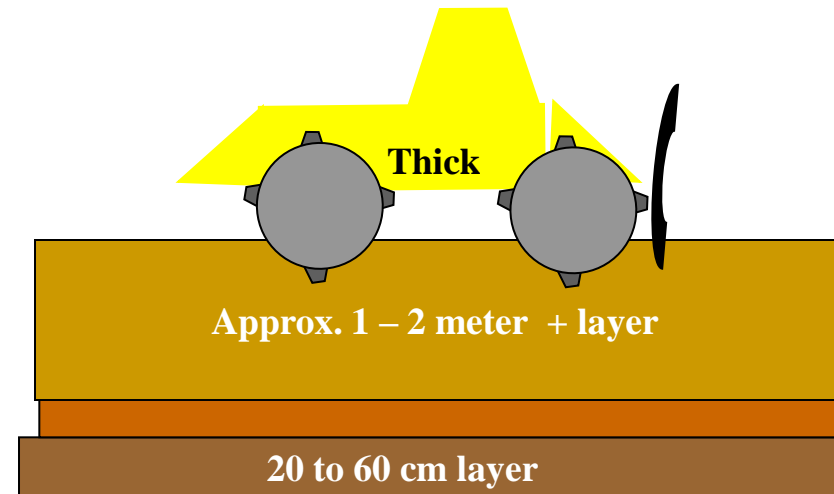
- Fuel — extra fuel used due to thick layers





# Layer Height or Thickness

- Thick layers only compact the surface
  - Subsequent passes only compact the surface
  - Waste below the surface compacts slightly but remains spongy
- Thin layers, blend, bind, shred, compact uniformly
  - Subsequent passes keep binding together

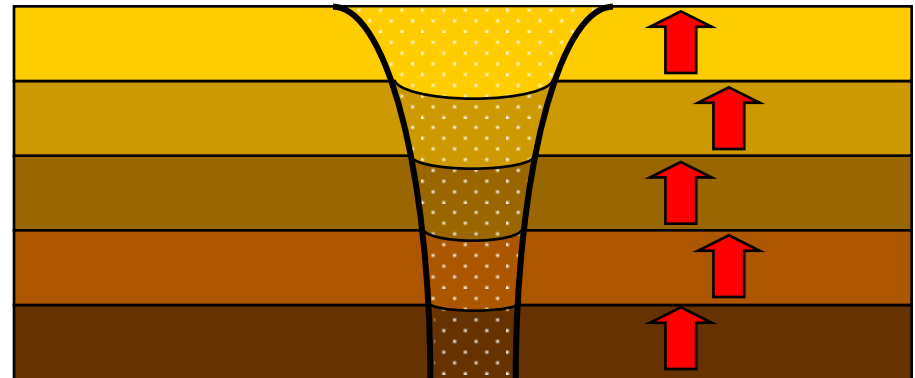




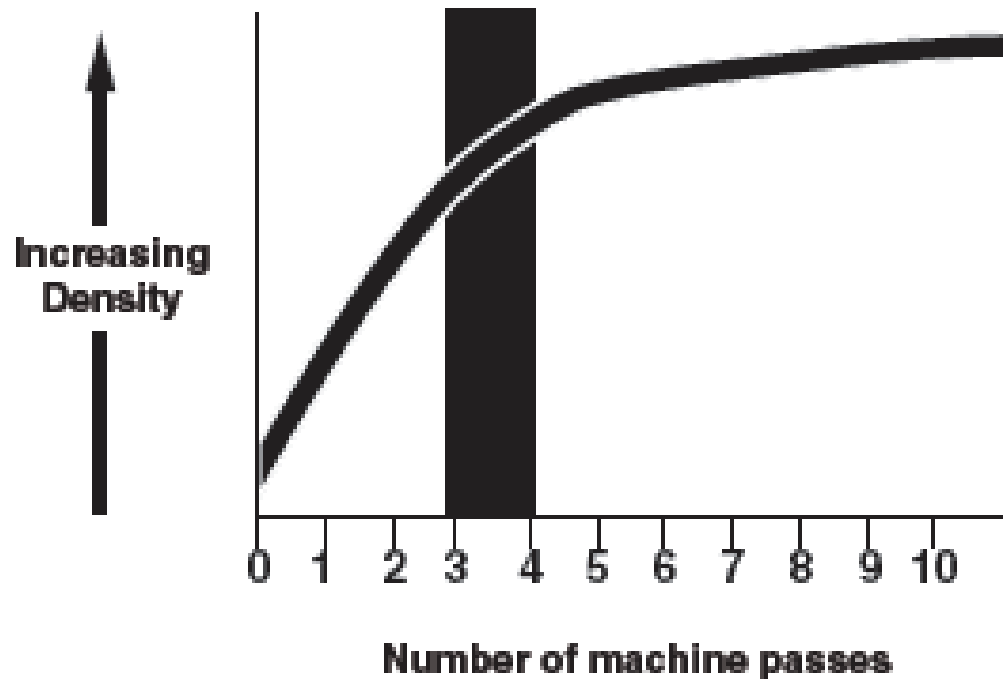
# Layering (Spreading) Material

- Develop compaction from bottom up
  - layers .4 m - .6 m
  - new layer covers old
- Problems compound as you build
- As thin as possible
  - short cycle times
  - less effort

Soft spot grows with each layer

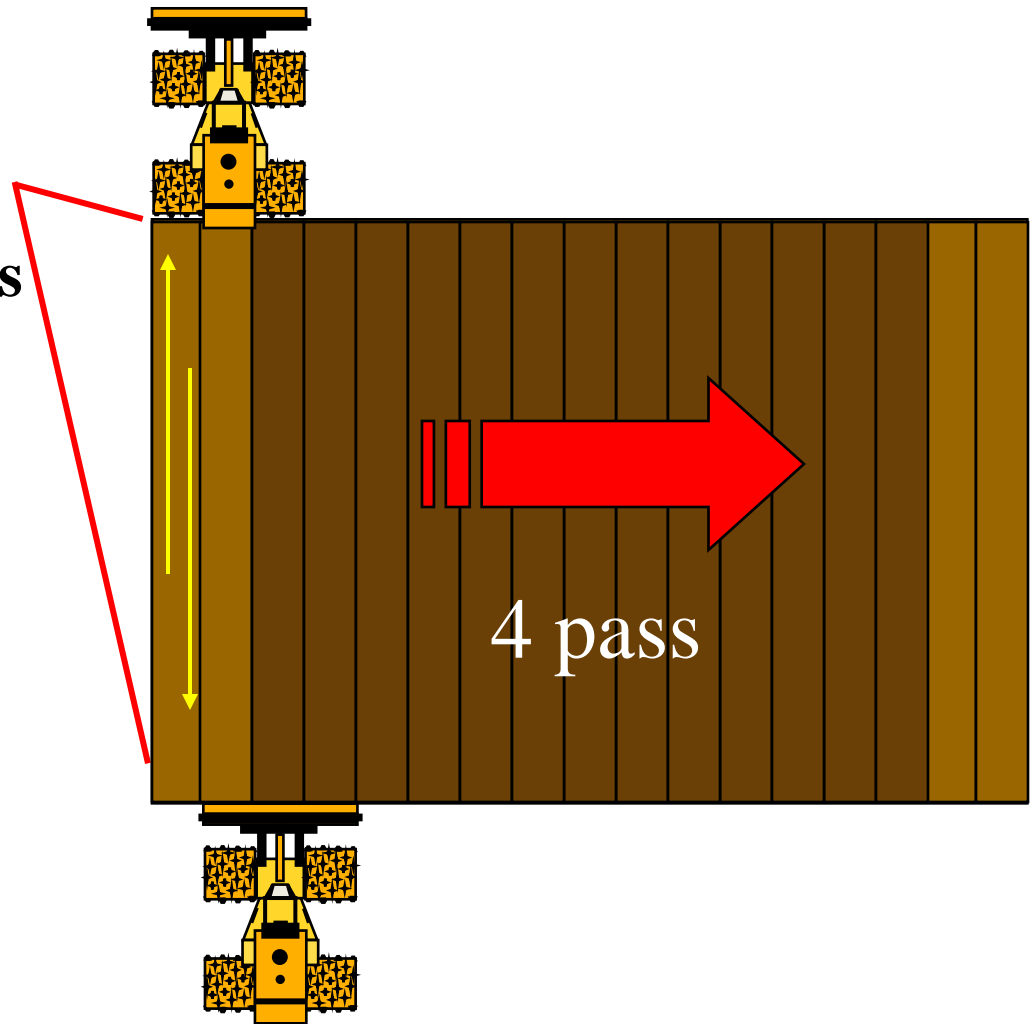


# Influence of number of passes on solid waste layer on final compaction



# Full 4 Pass Coverage

- **Straight up & down**
  - Move off face at ends
  - Reverse in same tracks
- **Side step**
  - One wheel width
  - Make turn off of face
- **Compacts all material**



# Uphill or Downhill Operation ??



**Operations & Efficiencies**



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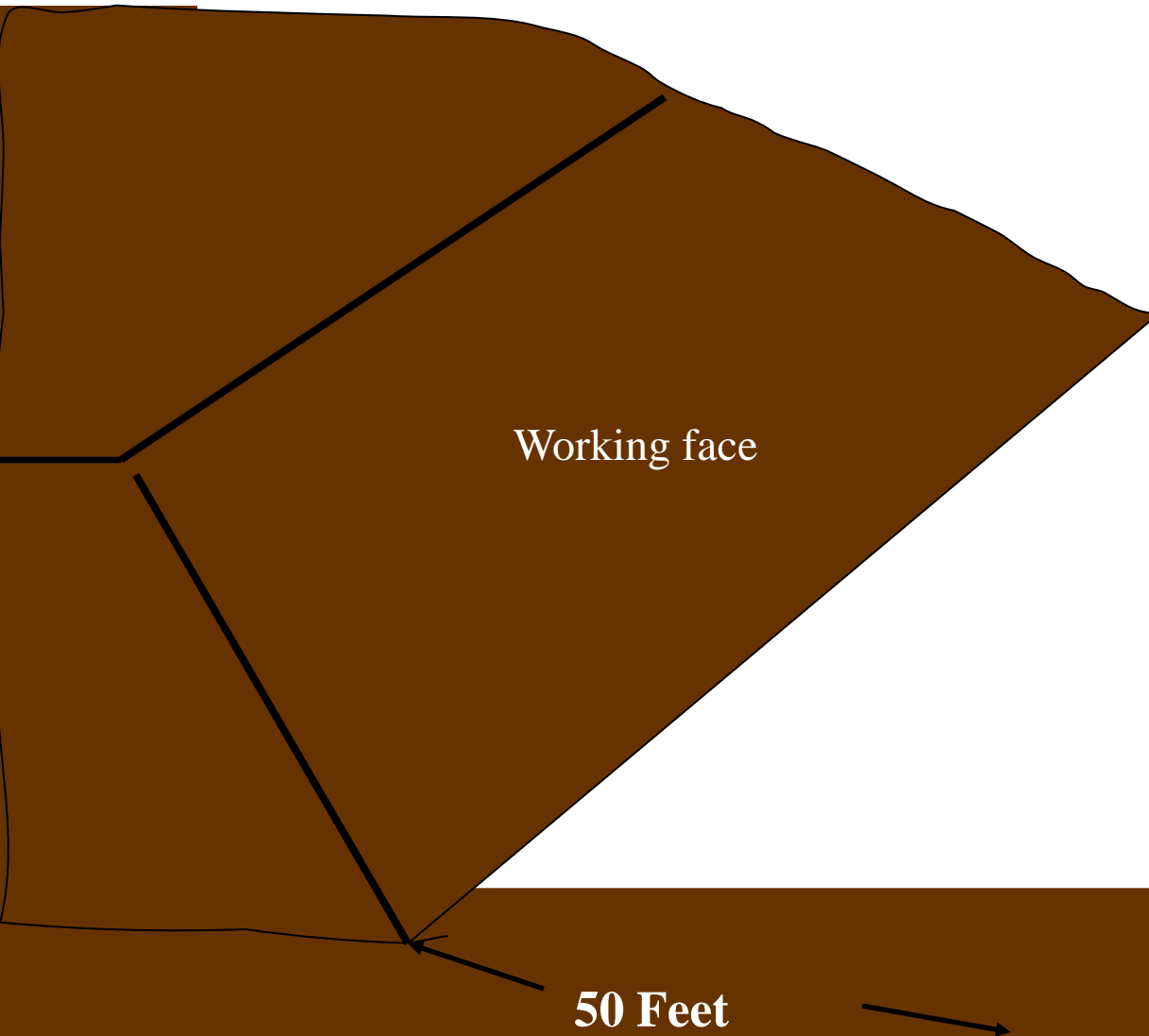
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# Landfill Best Practices

## Other considerations



## Flat layering

The following slide depicts the new trend towards flat layering material for maximum compaction

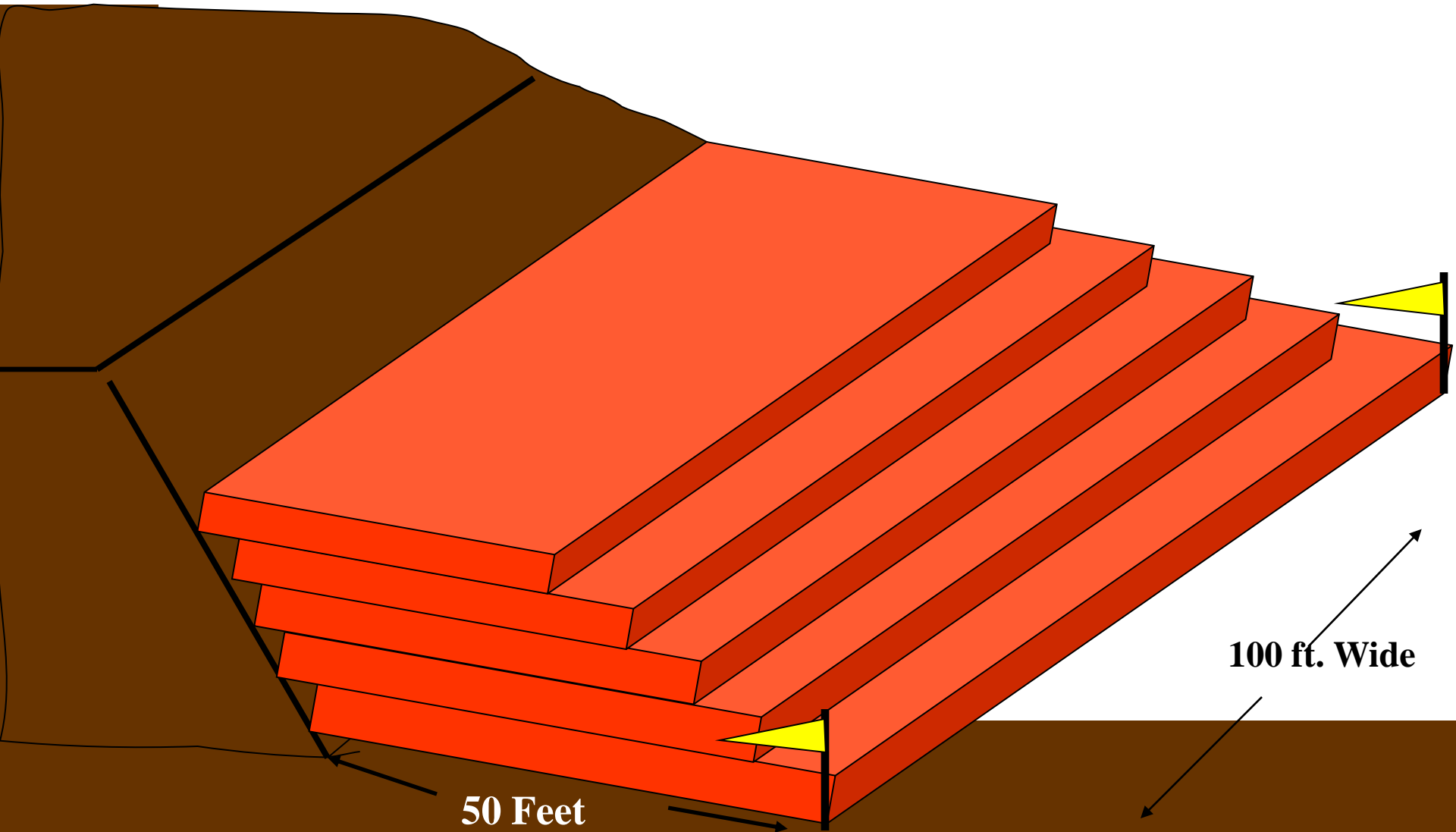
- Determine amount of area that will be used, stake the area, start layering and compacting
- You can either push uphill or downhill
  - Downhill works best



# Landfill Best Practices



## Other considerations

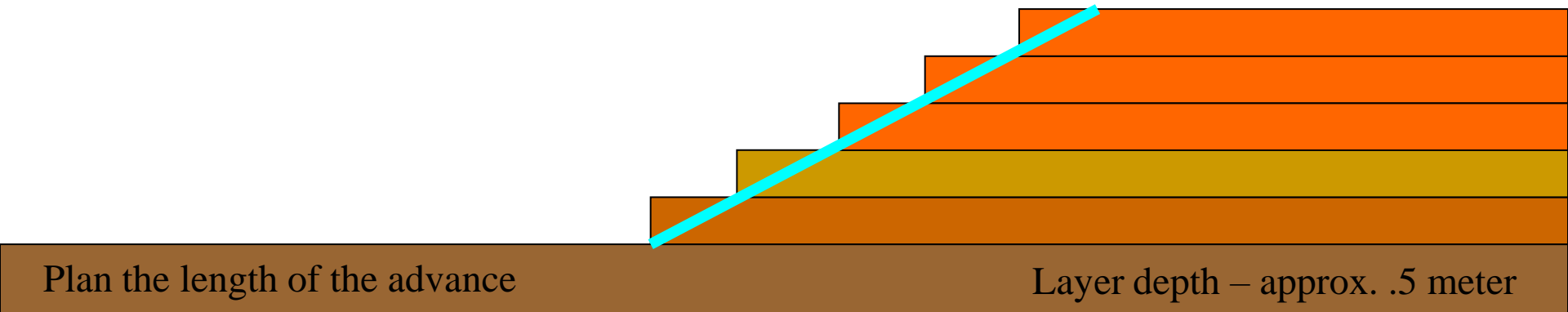




# Landfill Best Practices

## Other considerations

- Plan ahead to reach planned lift height
- If you reach lift height early – normal uphill operation / compaction
  - TTT push up / down - to compactor
  - TTT keeps 5:1 or 4:1 as day progresses
    - Or..run less grade and push up final grade at end of day
- Keep push / working distances short for push machines
- Downhill dump / push is faster
  - Uphill might get you better shredding - compaction





# Finally...

**Take the time to pick the Right Machine**

**What “must” be done, how fast, how well**

**What else would be “nice”**

**Understand the configuration differences**

**Necessary options?**

**Weight isn't always your friend within same size-class**

**Don't be afraid to “try” something new**

**If you don't try new ideas or ways of operation**

**Nothing will ever change**

**You can always “Go Back” to the way we've always done it.**



# Helping our customers BUILD A BETTER WORLD

