PROPOSED COMPACTOR EQUIPMENT

Tana North America, Ltd. & Humdinger Equipment, Ltd. offer landfill compactor choices from the Tana E Series Landfill Compactor product line. The following pages provide the specifications, capabilities, and costs information for the TANA E520 ECO, E450 ECO, E380 ECO, E320 ECO, or E260ECO model depending on your specifications that can achieve the objectives stated.

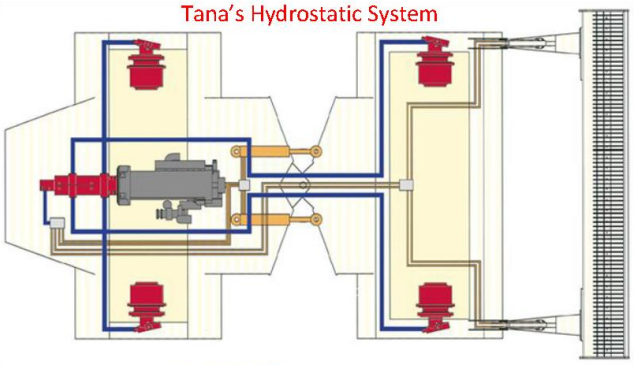
Tana developed the first purpose-built landfill compactor in 1969 that provide customers the capabilities listed below. Tana's has over thousands of compactors in landfills in over 100 countries world-wide successfully compacting every type of waste deposited in any landfill in the world under every type of weather and environment condition that exist.

- **Tana performs year-round compaction on residential and commercial wastes.**
- **Tana performs full load functions under extreme ice/snow/wet/dust/mud conditions.**
- **Tana performs full load functions on steep upslope sites and steep down slopes in excess of 30% grade.**
- **Tana's compactors are rated to work in temperature ranges from -40 to 122 degrees Fahrenheit.**

Hydrostatic Drive

TANA'S HYDROSTATIC SYSTEM vs. Power Shift Transmissions

Tana's Hydrostatic System



Competitor's Power Shift Transmission

The TANA Design:

- Two Pumps
- 2,3, 0r 4 Final Drives & Motors

TANA's Design Eliminates:

- Torque converter
- Power Shift Transmission
- Transfer gearbox
- Drive shafts & universal joints
- 2 differentials
- Disc Brakes (Service)
- Complicated control systems
- Clutch Pedal & Clutch
- Brake Pedal & Controllers

Easiest Operation Control System

- 100% Control with two joysticks
- No Foot Controls
- Drive direction and speed on one joystick – interchangeable
- Blade and steering on one joystick – interchangeable

RESULTS: TANA's simple hydrostatic system allows for a more efficient operator, less downtime and an overall cost advantage that is not possible with a power shift mechanical drive

Pumps

- One tandem pump arrangement
- Variable displacement axial piston pumps with electrical proportional control

Motors

- E520 & E450 has 4 variable displacement motors
- E380 has 3 variable displacement motors
- E320 & E260 has 2 variable displacement motors

Cooling of hydraulic system

- Air-operated oil cooler
- Removable air filtration screen

Hydraulic oil filtration

- Return line filter and two charge pressure filters

Final drive planetary system

- Transmits hydraulic power to the drums
- Three-stage planetary system
- Integrated multi-disk hydraulic parking brake
- Splash lubrication system

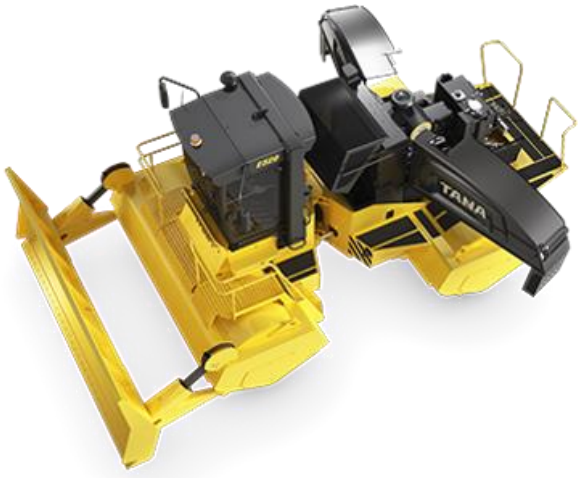
Hydrostatic System

- Separate systems for each drum
- High and low speed settings
- Driving speed & direction controlled with one lever
- Infinitely variable speed control

ENGINE, A/C & HEATER, WEIGHT

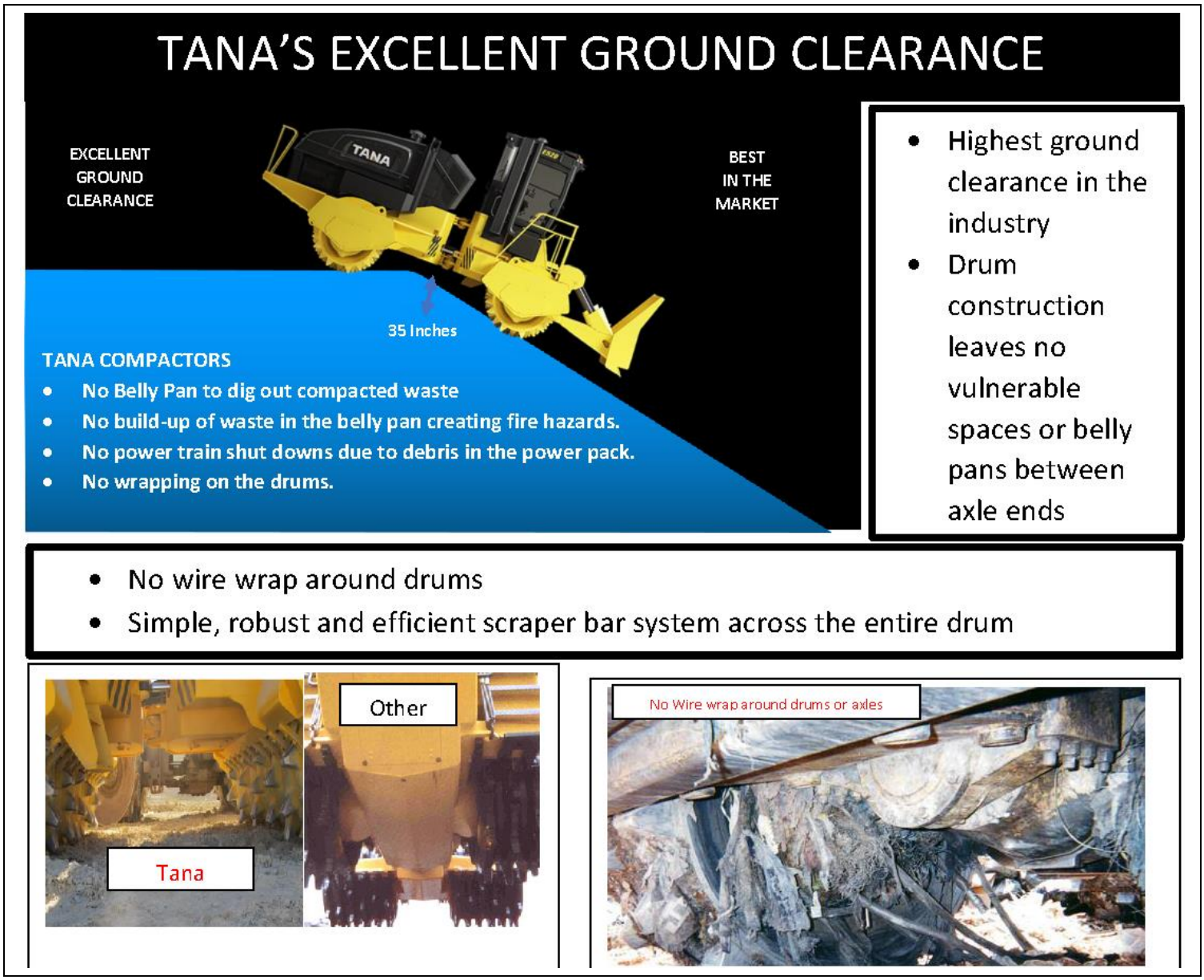
- **Air Conditioner and Heater –**
    - Standard OEM equipment includes air conditioner and heater that will work in temperature range of -40 to 125 degrees Fahrenheit.
- **Dry and Operating Weight** – Tana offers compactors at six different operating weights ranging between 57,000 and 121,000 pounds.
- **Engine** – Tana compactors utilize the Cummins diesel engines QSX15-C535 (E520 & E450), QSX15-C450 (E380), QSL9-C320 (E320), and a QSL9-C265 (E260) all with emission certifications U.S. EPA Tier 4 Final, CARB Tier 4 Final, and EU Stage IV.
    - All model's engines utilizes the following specifications with the Cummins Engine Performance Data enclosed.
        - Turbo charged, 6 cylinders in line, after-cooled electrically controlled diesel engine that communicates with the TCS system
        - Fulfills EPA & CARB Tier 4 Final and EU Stage IV non-road emission certificates
        - Engine equipment
            - Dry type air cleaner with replaceable primary and safety element
            - Built-in pre-cleaner and service indicator
            - 1 piece fuel filter and water separator & 1 piece oil filter
            - Reversing Fan
            - Exhaust muffler
            - Radiator with separate charge air cooler
        - Starter motor 24 V
        - Alternator 24 V, 105 A (other amp options available)

EASIEST ACCESS OF ALL COMPACTORS



GROUND CLEARANCE

- **High Ground Clearance** – Tana's compactors have the highest ground clearance in the industry.
  - Tana's ground clearance is 35 inches
  - Drum construction leaves no vulnerable spaces or belly pans between axle ends where waste can build up requiring continuous cleaning while reducing the compaction capability of the machine.
  - Built-in wire cutters in the drums do not allow wire to wrap around the drums requiring cleaning that takes time away from the operating compacting the waste.
  - Standard scraper bar system is simple, robust, efficient, and built on both sides of the drums that eliminates any waste build-up on the drums or underneath the compactor. This allows the operating to spend his or her time compacting waste without the need to continuously clean the wheels. The internal comb design of the drum and scraper bars also contributes to the elimination of the build-up of waste underneath the compactor.



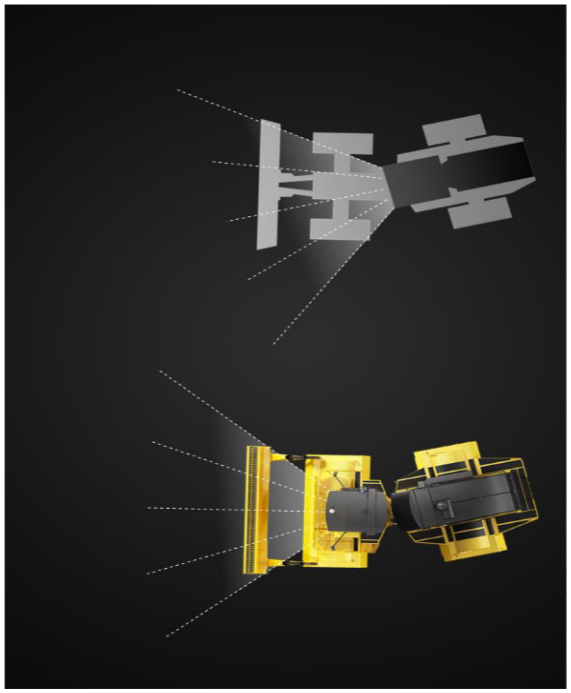
VISABILITY

Best in the Market!

CABIN FORWARD DESIGN

SEEING MORE = BETTER PERFORMANCE & SAFETY

- Weight is equally distributed to each drum
- Cab is on a separated frame from the engine greatly reducing noise
- Improved visibility out of rear window
- Design allows more efficient blade operation
- Full visibility of the blade at any articulation
- Operator can always see bottom of blade for optimal spreading
- Improved all-around visibility
- Improved safety with better visibility



- **Operator has visibility of the entire blade and the compaction of the waste at all times**
- **Better visibility out of the rear window.**
- **Machine's weight distribution to the forward and rear sections is equal helping to achieve higher compaction.**

BLADE DESIGNS

Made in TEXAS

Tana North America designs and builds dozer blades for the Tana compactors

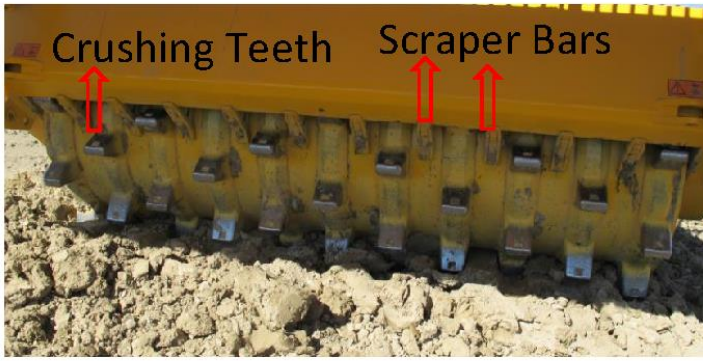
- TALLEST DOZER BLADE BY CLASS IN THE MARKET
- STRAIGHT & SEMI-U BLADE OPTIONS
- E450 & E520 - 197 IN. WIDTH & 90 IN. HEIGHT
- E380 – 177 IN. WIDTH & 77 IN. HEIGHT
- E260 & E320 – 144 IN. WIDTH & 77 IN. HEIGHT
- 46-48 IN. MOVEMENT ABOVE GROUND LEVEL
- 6 IN. MOVEMENT BELOW GROUND LEVEL
- BOLT-ON REVERSIBLE CUTTING EDGES
- ARM JOINTS EQUIPPED WITH HARDENED PINS AND SPHERICAL BEARINGS

TANA ROLLER COMPACTION METHOD

Wheels -- Tana's compactor technology includes the twin drum compaction system that provides for the greatest compaction results in the industry.

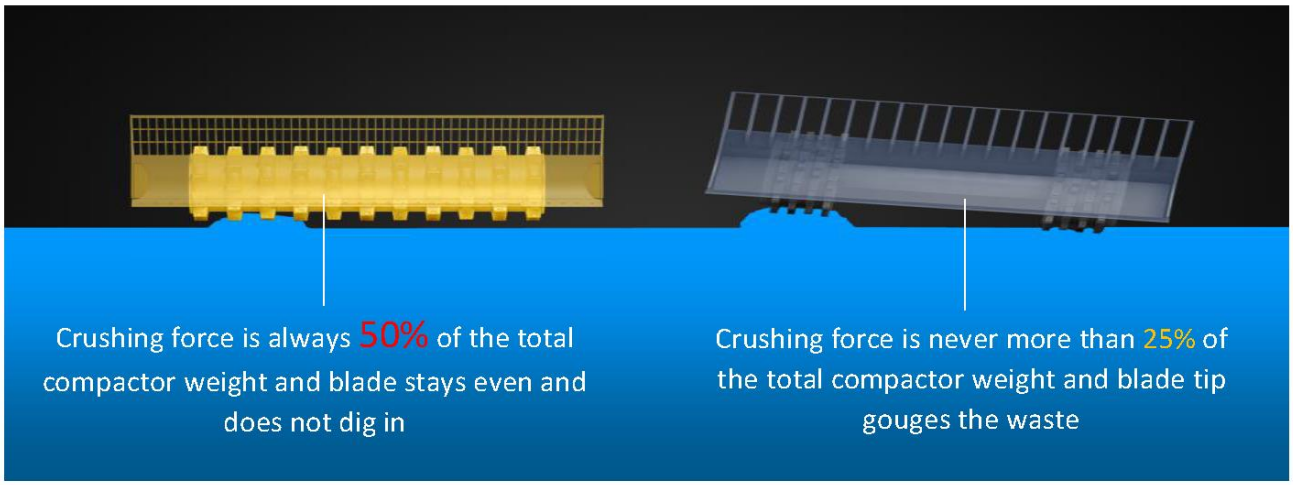
- E520 & E450 includes two 150 inch width compaction drums. Drums have 110 crushing teeth each, or a total of 220 crushing teeth that are 8 inches in height. The standard scraper bar system include 20 scraper bars on each drum. The compactor also has 2 wire cutters on the front drum and 4 wire cutters on the rear drum. The E320 & E260 includes two 105 inch width compaction drums. Drums have 80 crushing teeth each, or a total of 160 crushing teeth that are 8 inches in height. The standard scraper bar system include 14 scraper bars on each drum. The compactor also has 2 wire cutters on the front drum and 4 wire cutters on the rear drum. E520 & E450 includes two 150 inch width compaction drums. Drums have 110 crushing teeth each, or a total of 220 crushing teeth that are 8 inches in height. The standard scraper bar system include 20 scraper bars on each drum. The compactor also has 4 wire cutters on the front drum and 4 wire cutters on the rear drum.

TANA ROLLER COMPACTION (TRC) METHOD



- Two full-width passes creating uniform compaction
- Highest capacity tonnage per hour in the market
- Excellent traction with no loss of compaction force
- Smooth, level surface
- High Spots get maximum force applied while blade does not dig in
- No cabin swing or weight shift
- 80 to 110 "Big Foot" crushing teeth per drum maximizing crushing force
- Even load spreading providing maximum compaction
- Scraper bar system keep drums clean and wire cutters eliminate wrapping

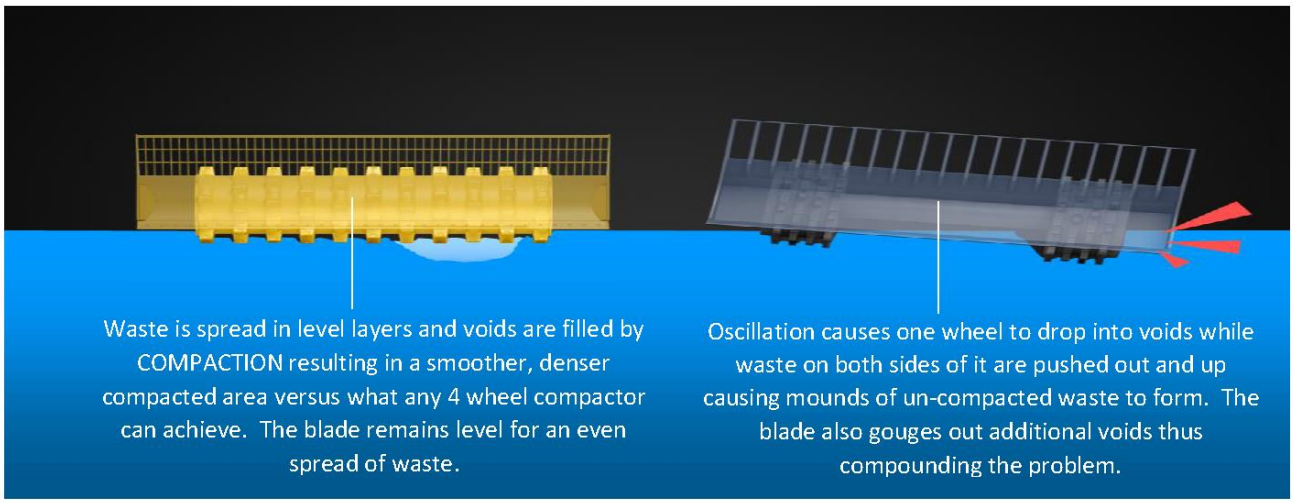
RIGID FRAME MAXIMIZES CRUSHING FORCE



Crushing force is always 50% of the total compactor weight and blade stays even and does not dig in

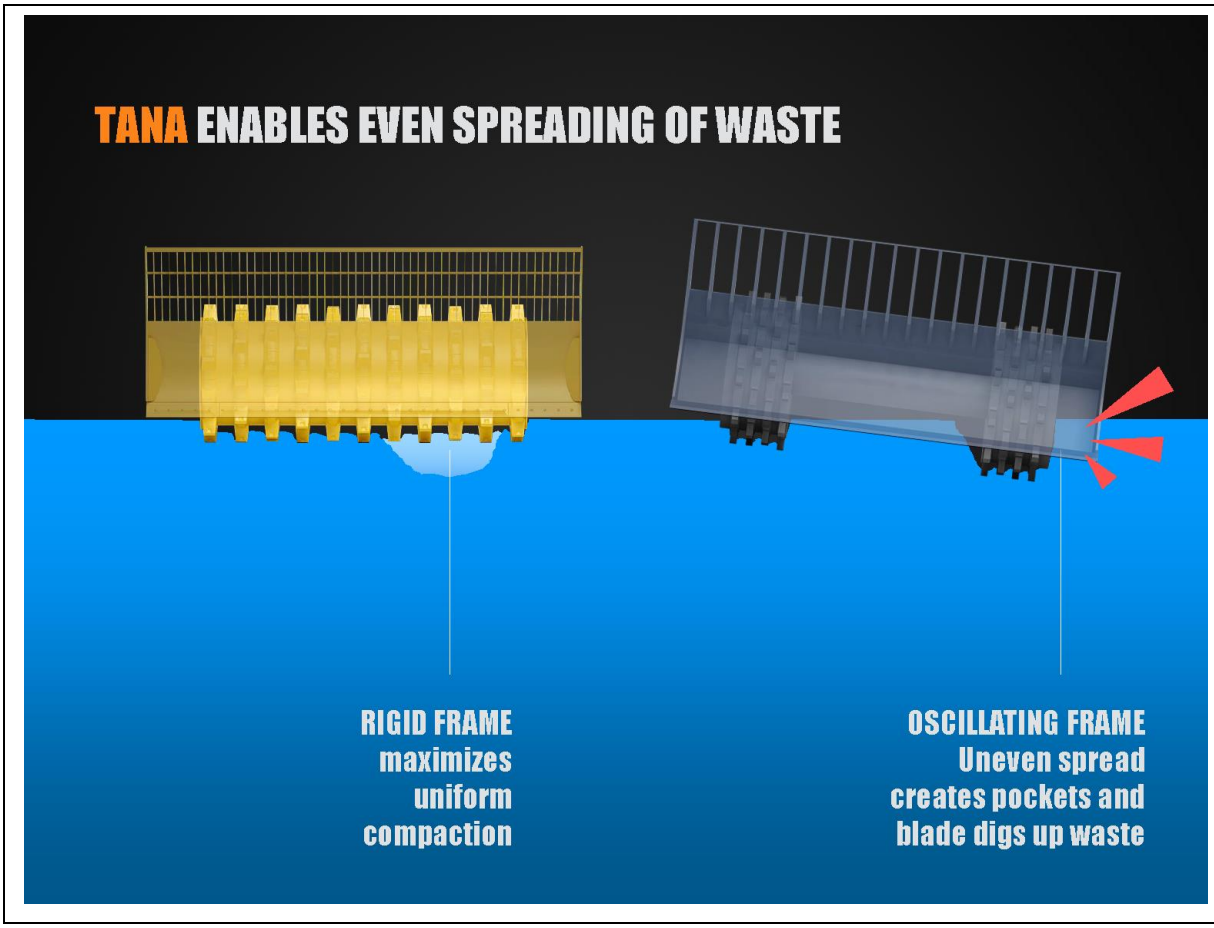
Crushing force is never more than 25% of the total compactor weight and blade tip gouges the waste

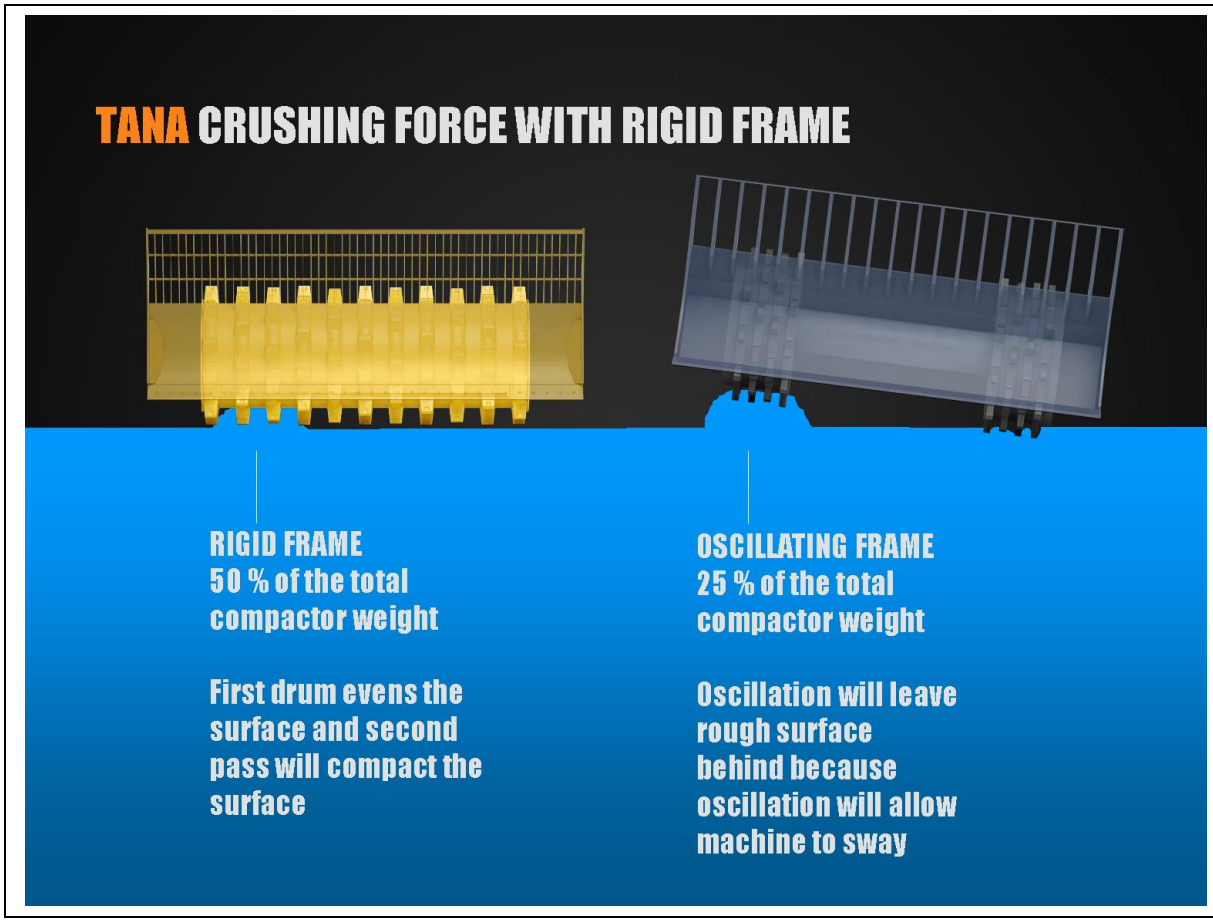
RIGID FRAME ENABLES EVEN SPREADING OF WASTE



Waste is spread in level layers and voids are filled by COMPACTION resulting in a smoother, denser compacted area versus what any 4 wheel compactor can achieve. The blade remains level for an even spread of waste.

Oscillation causes one wheel to drop into voids while waste on both sides of it are pushed out and up causing mounds of un-compacted waste to form. The blade also gouges out additional voids thus compounding the problem.


TANA ENABLES EVEN SPREADING OF WASTE
RIGID FRAME
maximizes
uniform
compaction
OSCILLATING FRAME
Uneven spread
creates pockets and
blade digs up waste


TANA CRUSHING FORCE WITH RIGID FRAME
RIGID FRAME
50 % of the total
compactor weight
First drum evens the
surface and second
pass will compact the
surface
OSCILLATING FRAME
25 % of the total
compactor weight
Oscillation will leave
rough surface
behind because
oscillation will allow
machine to sway

FIRE SUPPRESSION SYSTEMS
(OPTIONAL)

- Ansul, , Amerex, or AFEX brands along with others can be installed to protect your investment against fire in the engine compartment and hydraulic areas. Tana North America utilizes certified region fire suppression companies to install and service your fire suppression systems.
- The twin drum design of the Tana compactors provides less opportunity for fires to start because of the higher compaction rates, smoother surfaces, and less voids created by the 3 and 4 wheel designed machines.

VEHICLE FIRE SUPPRESSION SYSTEMS

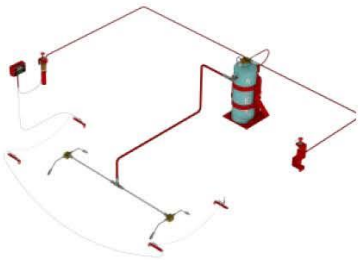
DRY CHEMICAL AGENT SYSTEMS

Providing the most efficient protection of any fire suppression system, dry chemical systems are the industry standard for heavy equipment applications. Dry chemical is effective against Class A (debris), Class B (fuel), and Class C (electrical) fires. These types of systems work by flooding a volume of space, such as a vehicle engine compartment, with a the fire fighting agent to suffocate the flame.

Dry chemical systems provide fast fire knockdown and perform especially well in enclosed ares. They are suitable for temperatures as low as -40°F (-54C) and are available in 20, 30, 60, and 125 pound sizes.

LIQUID AGENT SYSTEMS

Providing exceptional cooling abilities and Class A (debris) and Class B (fuel) fire suppression, customers around the world are adding liquid agent systems to their fire protection programs. The liquid agent works by cooling hot surfaces, separating fuel hydrocarbon molecules to prevent it from igniting, and forming a layer of foam to suffocate the flame. The systems are suitable for temperatures as low as -40°F (-40°C) and available in 5, 15, and 30 gallon sizes.

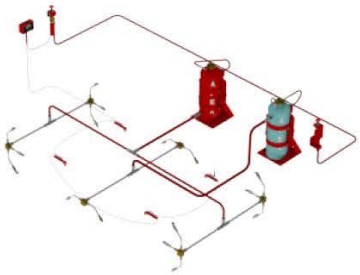


DUAL AGENT SYSTEMS

As technology advances, equipment manufacturers are designing machines that are more powerful and productive while also reducing emissions. The downside to these advancements is increased heat throughout the engine compartment and more hydraulics, creating additional and more severe fire risks.

Dual agent systems combine the benefits of dry chemical with the benefits of liquid agent creating an effective way to address these risks.

Dual agent systems are so effective that the National Fire Protection Agency requires them for large hydraulic shovels. Not only are they more effective, dual agent systems require less space and are more economical than a comparable liquid-only system for the same machine.



FUEL TANK CAPACITY

- Tana’s compactor fuel tank capacity is 201 gallons

BEST OPERATOR RIDE IN THE MARKET

- **Cab Forward Design minimizes operator‘s blind spots.**
- **100% walk-around access on deck level provides a safer maintenance work environment.**
- **Operator has clear vision of bottom of blade at any articulation**
- **Rigid frame structure reduces cabin sway**
- **72.5 dB(a) – lowest in the market**
- **100% joystick controlled**
- **Flat surfaces – most comfortable to drive**

TANA'S PERFORMANCE ADVANTAGE

The history of Tana goes back to the late sixties as a family-run garage operation business. A lot has changed since the 1960s.

Tana designed and built the first ever purpose-built landfill compactor. This separates Tana from most competitors who replaced rubber tires with steel wheels on their front-end loader and called it a landfill compactor. Since the 1960s Tana has continued to develop through its seven models of compactors the most effective landfill compactor available in the world.

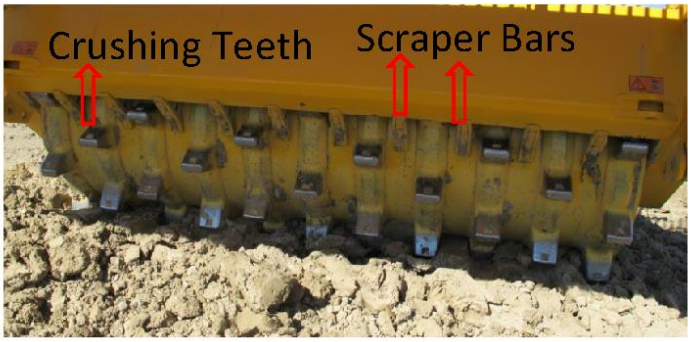
How is this achieved?

Tana's design utilizes what we call the "TANA Roller Compaction" (TRC) Method. This method is the combination of twin-drum full-width wheels, a rigid frame design, and 80 to 110 Big Foot crushing teeth per compaction drum. This combination provides the platform that achieves the following:

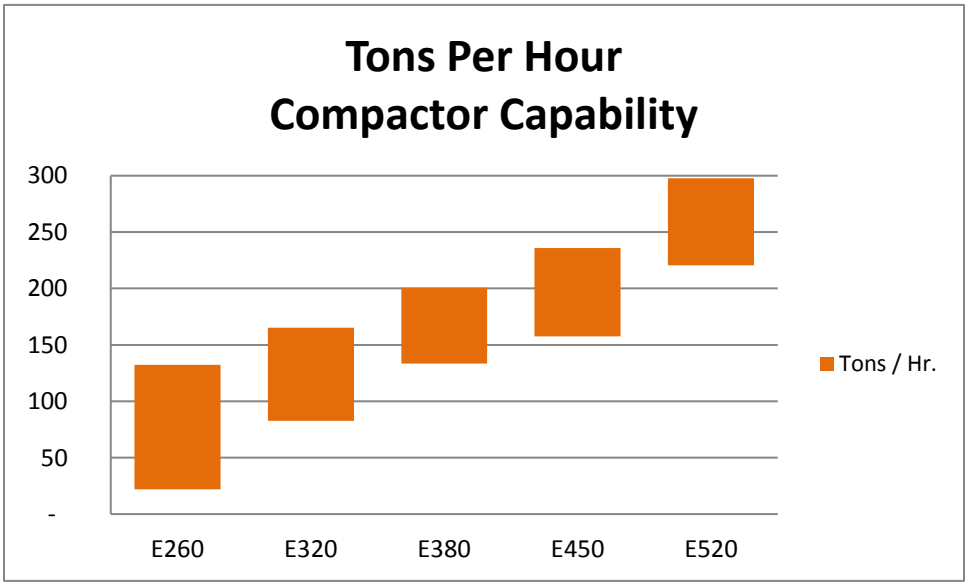
- Improves profits through increased revenues and / or reduced expenses
- Greatly extends the life of the landfill
- Improves all vehicle cycle time in and around tipping area
- Reduced voids lessen opportunities for rodents to build nests
- Reduces amount of lechate created
- Reduces landslides and cave-ins
- Less cover soil required because of even surface
- Greatly reduces risk of fire
- Minimized airborne debris and odor
- Reduced chassis damage to all vehicles on site - smooth compacted surface

Tana's TRC Method surpasses the capabilities of its three (3) and four (4) wheel competitors because of the actual ground pressure realized with the single full-width drums, the number of teeth engaging the waste at any given time, and the weight distribution advantages of a rigid frame versus the oscillating frames of our competitors.

TANA ROLLER COMPACTION (TRC) METHOD



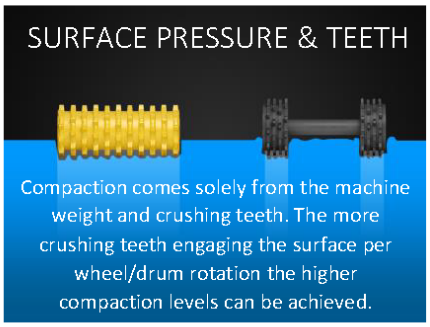
- Two full-width passes creating uniform compaction
- Highest capacity tonnage per hour in the market
- Excellent traction with no loss of compaction force
- Smooth, level surface
- High Spots get maximum force applied while blade does not dig in
- No cabin swing or weight shift
- 80 to 110 “Big Foot” crushing teeth per drum maximizing crushing force
- Even load spreading providing maximum compaction
- Scraper bar system keep drums clean and wire cutters eliminate wrapping

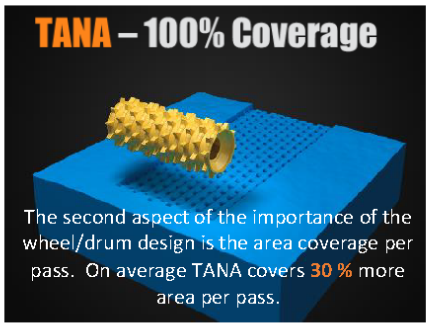


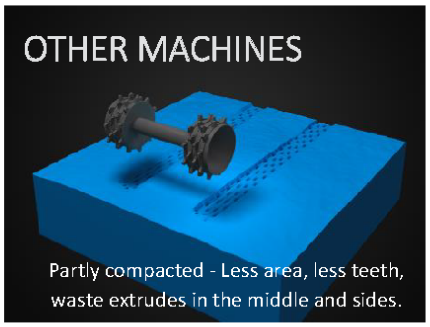
TWIN FULL WIDTH DRUMS

Tana's TRC Method also provides advantages through the full width compaction and even surfaces that are realized during operation. This assist in achieving higher compaction rates as well as reducing the operating cost due to the speed at which desired compaction will be reached. The depiction below provides a visual of how Tana's TRC Method compares to its four (4) wheel competitors. It can clearly be seen how the four (4) wheel compactor creates blowout of waste to the outside and inside of the compactor. This blowout must then be passed over again while the four (4) wheel compactor continues to create more blowout to the outside and inside. It is very difficult for the compactor driver to be able to easily line-up the compactor with the blowout waste; therefore, requiring much more time to cover the waste needing compaction. Through independent study it has been consistently proving that the Tana compactor will reach or exceed desired compaction levels in 30-40% less time than its four (4) wheel competitors.

TWIN DRUMS PROVIDE FULL WIDTH COMPACTION AND EVEN SURFACE



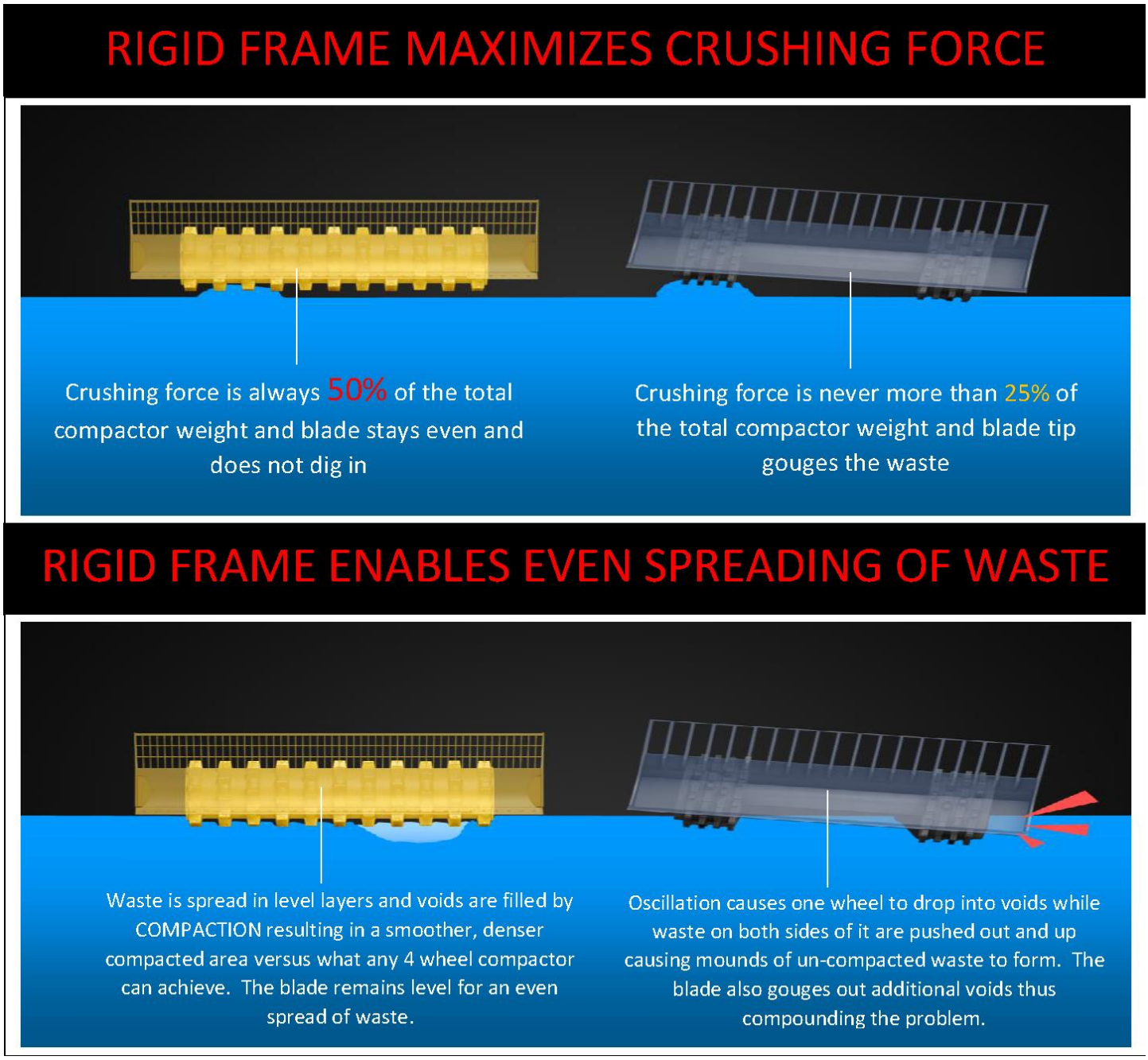




- Reduces waste blow-out created by four wheel compactors
- Compaction achieved quicker because operator does not have to go over and over and over the mounts creating more problems in the process
- Maximum compaction is achieved in less time
- 15-25% more waste compacted per square yard with twin drum technology
- 30-40% less time results in savings for fuel, labor, and service
- 40-60% less cover material because of the flatness and tightness of the face

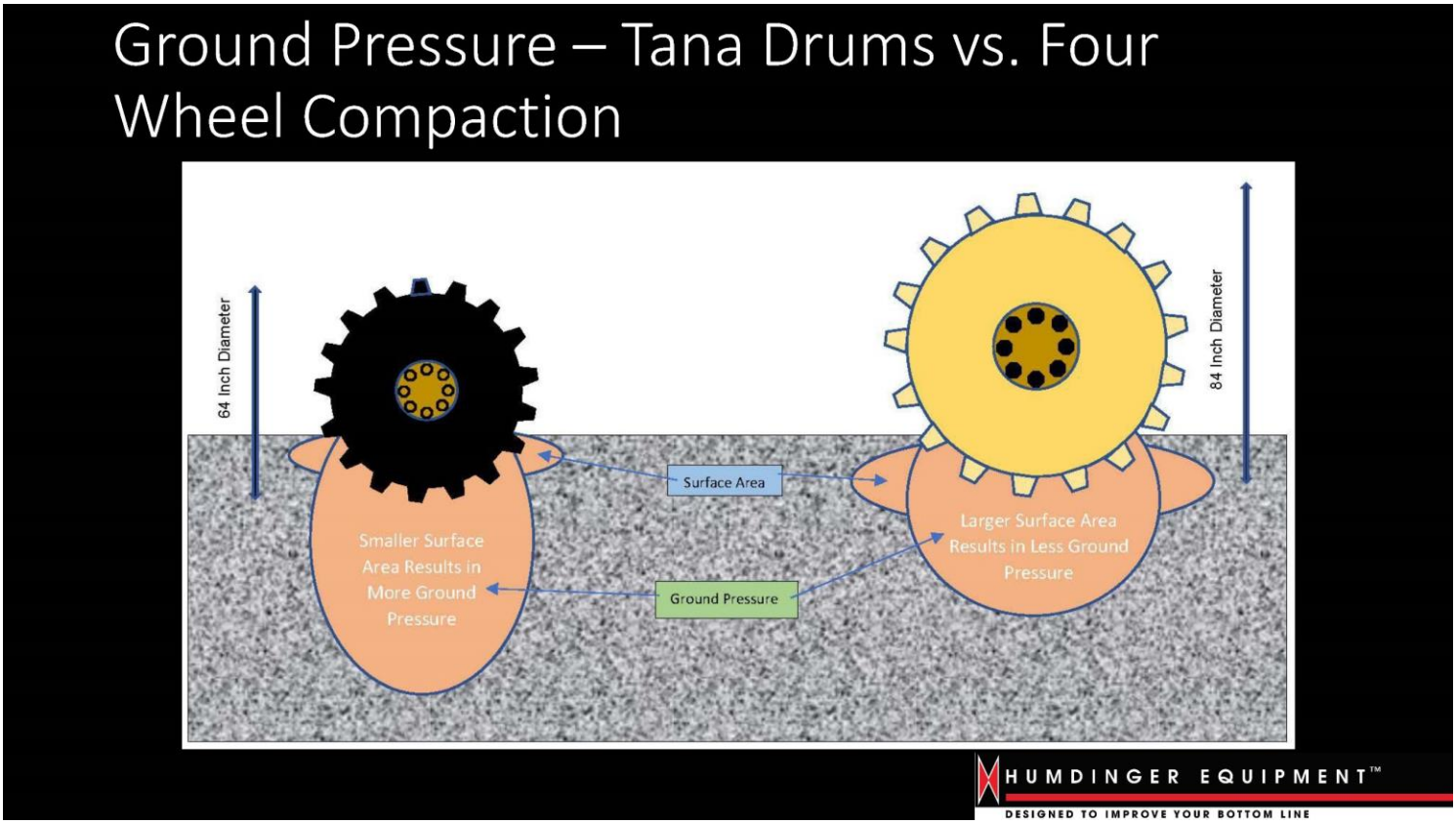
RIGID FRAME

Another performance advantage Tana's TRC Method has over its competition is its rigid frame design versus the oscillating frame design of other compactors. The crushing force with a rigid frame design is double the crushing force of an oscillating frame on high mounds of waste. The rigid frame also is always spreading in level layers and voids are filled by compaction resulting in a smoother, denser compacted area versus what any four (4) wheel oscillating frame compactor can achieve. The blade on the rigid frame is either in a high mound or void situation always staying level with the twin drum; therefore, does not dig out compacted waste on the low side of the blade like occurs with the oscillating frame compactors.

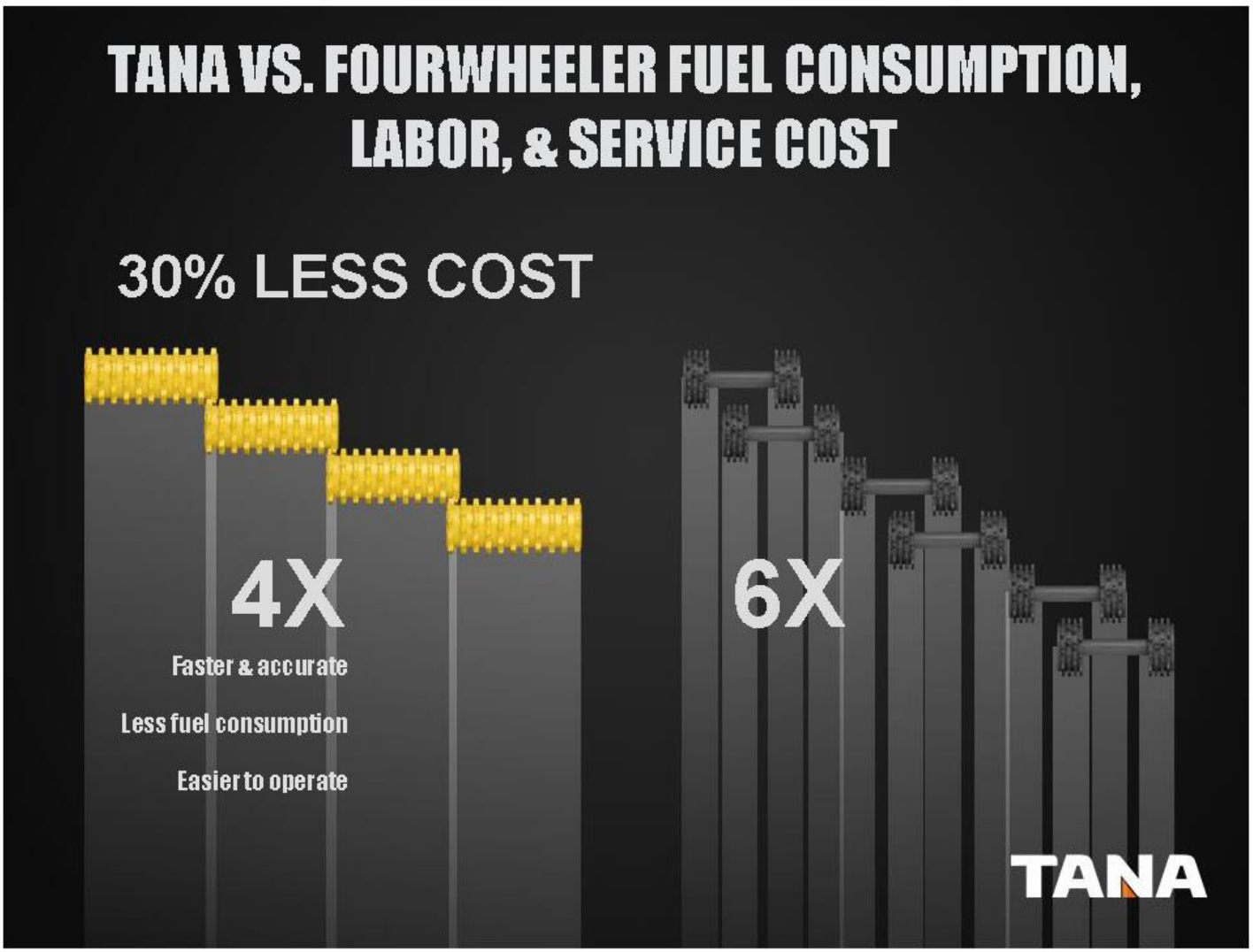


GROUND PRESSURE

TWIN DRUM VERUS FOUR WHEEL DESIGN



OPERATIONAL COST ADVANTAGES



ENGINE, A/C & HEATER, WEIGHT

Tana's landfill compactors provide for the highest level of stability compared to its competitors largely due to the full width twin-drum design and the cab forward design of the compactor.

TANA'S SUPERB STABILITY

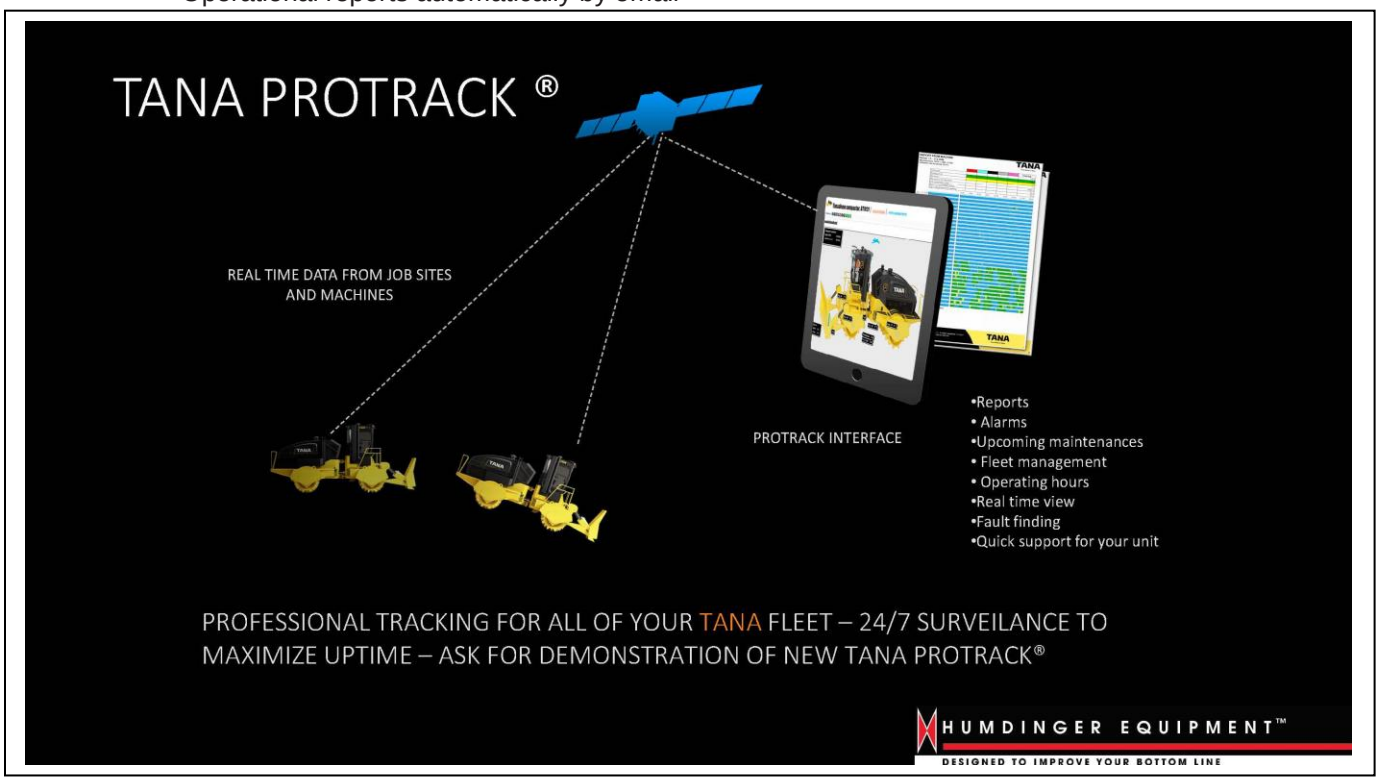
- Maximum sideways tilt angle over 50 degrees
- Climb and descent angles are only limited by available traction
- Minimum Cabin Sway due to rigid frame

TANA CONTROL SYSTEM (TCS) & PROTRACK

Tana's TCS and ProTrack reporting capabilities allow communication between the landfill compactor and the landfill's management, Tana's technical service, and any other person you desire. This system monitors all areas of the machine during operation including fuel, hydraulic oils, temperatures, alarms, etc. The information is automatically created into reports and sent to management and service so appropriate actions can be made. This system has greatly increased machine uptime and reduced maintenance cost. All critical alarms will create notifications to be sent by email to management and technical service so appropriate actions can be taken.

Features:

- Wireless connection to the control system of the machine via internet
- Valuable advantages to daily operations
- Immediate connection to the control system for trouble-shooting
- Operational reports automatically by email



TANA ProTrack Service Pack

- Provides immediate technical back-up and trouble-shooting
- Minimizes traveling
- Simplifies trouble-shooting
- Ensures maximum machine uptime
- Service record always available
- Maintenance reminders sent by email
- Critical alarm notifications sent by email
- Quicker Reaction to critical alarms minimizes possible damage