The Use of Global Positioning Systems to Improve Landfill Performance

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IT’S ROCKET SCIENCE
WHAT ARE THE POTENTIAL BENEFITS?
<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>Operator Feedback</td>
<td>• Real-time waste compaction monitoring</td>
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<tr>
<td>Compaction</td>
<td>• Increased waste density and uniformity</td>
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<tr>
<td>Less Fuel</td>
<td>• Improved fuel efficiency and productivity</td>
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<tr>
<td>Compliance</td>
<td>• Monitor final grades to maintain compliance</td>
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<tr>
<td>Construction</td>
<td>• Used for liner and final cover construction</td>
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<tr>
<td>Record Keeping</td>
<td>• Records locations of special waste</td>
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<tr>
<td>Less Surveying</td>
<td>• Reduced need for professional services</td>
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<tr>
<td>Less Soil</td>
<td>• Reduction in soil cover quantity</td>
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</tbody>
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CASE STUDIES

- 1,100 tpd
- CAT CAES System (2001)
- CAT 836 Compactor
- Improved compaction
- Reduced survey costs
- Reduced cover
- Increased machine productivity
- Reduced fuel usage
- Better slope management

Lanchester Landfill, Honey Brook PA

Thanks to Bob Watts of Chester County Solid Waste Authority
Lanchester Landfill, Honey Brook PA

- 770 tpd
- CAT 836 Compactor
- Improved compaction
- Spot surveys
- Reduced fuel usage
- Good tool for outer slopes
- Seeking to connect GPS and GIS

Thanks to Steve McElwain of DANC

DANC Landfill, Rodman, NY
DANC Landfill, Rodman, NY

- 1,300 tpd
- Topcon with Terramodel Software (2008)
- CAT 836 Compactors
- Improved compaction
- Reduced survey costs
- Reduced cover
- Reduced fuel usage
- Increased machine productivity
- Better slope management
- Occasional software problems

Camelot Landfill, Lewisville, Texas

Thanks to Kate Van Sanford of Republic Services, Inc.
Camelot Landfill, Lewisville, TX

AIRSPACE = $
1,000 tpd landfill
$25/ton
AUF 1,200 lbs/cyd

- AUF 1,250
  - 4% increase
  - 19,000 cyds/yr
  - $298,000

- AUF 1,300
  - 8% increase
  - 37,000 cyds/yr
  - $596,000

1,000 tpd Landfill

- Airspace Utilization Factor (lbs per cubic yard)
- Annual Consumed Airspace (Cubic Yards)

Airspace Gained = 19,067 CY
Est. Value = $297,917

Airspace Gained = 36,667 CY
Est. Value = $595,833

Gershman, Brickner & Bratton, Inc.
IT’S NOT ALL

Cost
- Expect $100,000 + capital and additional O&M

Vendor Support
- Choose vendors who will provide training and support

Personnel Acceptance
- Dogs and new tricks

Things will go wrong
- Software, hardware, bad data
CONCLUSIONS

GPS systems

- Reduce soil usage
- Improve sideslopes
- Reduce fuel consumption
- Reduce surveying costs
- Locate special wastes
Evidence from 3 case studies supports that GPS can improve landfill compaction

- Compaction improvements can be significant
- Even small compaction improvements bring large $ gains

Manage the GPS Systems

- Choose a responsive vendor
- Train operators
- Update hardware and software as necessary
- Add repeaters as needed
Thank you!!

Questions and comments?

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