Sustainable Scale House Design

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Overview

- **Proper Planning** - Siting, design and construction of a landfill’s scale house, coupled with technological innovations, can significantly improve the efficiency of any operation in the present while allowing for expansion to meet the demands of the future.
- **Effective communication** - Contractors, designers, regulators, and owners/operators.
- **Design considerations** - Example designs, lessons learned, and recommendations for efficient and economical scale house designs.
Proper Planning – Design Considerations

- Site Life
- Location & site constraints
- Who are your customers?
- Data collection – What’s important?
- Average transaction time
- Traffic control
- Future conditions
- Safety
- Stormwater management
- Utility connections
- Backup power
- Innovation
- Security
- Scale selection
- Permanent or temporary structures?
- Maintenance
- Project budget
- Project timeline
Proper Planning – Communication

- Stakeholders - Who to involve in the design process?
Site Life, Location & Constraints:

- Site facility for long-term operation
- Avoid relocation & additional road construction
- Allow for sufficient queuing
- Allow for future expansion
- Consider future conditions
- Utility connections
Who Are Your Customers?

- General public
- Commercial
- Industrial
Data Collection – What’s Important?

- Material type
- Material volume
- Material weight
- Customer type
- Frequency
- Average transaction time
Data Collection – What’s Important?

Impacts on the following:

- Scheduling
  - Capital projects
  - Equipment required during shift(s)
- Compaction
- Operations
- Staffing
- Equipment replacements/upgrades
Average Transaction Time

- Inefficiencies
- Number of scales
- Number of scale operators
- Safety risk potential
Average Transaction Time

- Single scale for inbound/outbound traffic
Average Transaction Time

- Additional inefficiencies
Traffic Control - Volume

- Volume - impact on operations
- Design for future conditions
Traffic Control

- Traffic lights to indicate available scales
- Manual/pressure activated lights
- Two-way traffic for surge times
Present/Future Conditions
Future Conditions

Flexibility for operations
Future Conditions
Site constraints/limitations?
Safety

- Traffic lanes & walking lanes
- Line of sight
- Speed bumps
- Striping
- Guard rails & reinforced curbs
- Bollards... Lots of bollards!
- Proper signage
- Lighting
Stormwater Management

- Proper drainage
  - Critical for freezing conditions
  - Reduce sediment accumulation
  - Easier O&M
  - Protect your assets
- Temporary stormwater control measures
- Permanent stormwater control measures
Innovation

- Pneumatic system
  - Additional scales w/o additional scale operators
Innovation

- Unattended systems
  - After hours operation
  - Cameras for still image capture or live video feed
  - License-plate readers
  - RFID cards for driver/vehicle identification
  - Automated gates and traffic lights
  - Good for exit scale operations
  - No scale operator required
Unattended Systems

1. Video cameras
   Store a visual record of each transaction to detect incorrectly positioned vehicles.

2. Traffic lights
   Lights work in conjunction with barriers to regulate traffic flow over a weighbridge.

3. License plate readers
   Provide positive identification of each vehicle.

4. Traffic barriers
   Prevent more than one vehicle from driving onto a weighbridge.

5. Vehicle position sensors
   Photo-eye sensors ensure that only one vehicle is on the weighbridge and that it is positioned correctly.

6. Unattended terminals
   Allow drivers to process transactions without a scale operator. Terminals can be programmed to identify vehicles and restrict access to a weighbridge.

7. Advanced load cells
   Breach-detection alarms built into each load cell prevent cheaters from tampering with weight signals.

8. Side rails or curbs
   Guide vehicles onto a weighbridge safely, and help position vehicles for honest weighing on pit scales.

9. Vehicle detection loops
   Control access to a weighbridge by detecting an approaching vehicle and activating traffic lights and barriers.

10. Vehicle scale software
    Select a system with fraud-prevention capabilities:
    - Security features prevent hacking
    - Tamper-proof audit log
    - Stored tax weights
    - Preloading prevents unauthorized transactions
    - Tracking of reprinted tickets
    - Weight curve identifies unusual changes in weight
    - Cameo option stores images with transactions

Mettler Toledo
Unattended Truck Scale System

Sanborn Head
Security

- Illegal dumping
- Fraudulent use of customer accounts
- Scale attendant theft
- Cash/credit transactions
- Fire alarm
Scale Selection

- Steel deck or concrete deck?
  - Similar cost & lifespan
  - Installation & calibration time
    - (1 day vs. 28 days)
  - Environment
  - Portability
    - 32,000 lbs vs. 100,000 lbs
Permanent vs. Temporary Structures
Maintenance

- Cleaning sediment/trash from below scales.
- Snow removal
- Load cell calibration/replacement
- Deck integrity
Maintenance
Backup Power

- Can your operation continue without electricity?
- Portable or stationary generator?
- Transfer switch
- Sizing for current/future loads
Project Budget & Timeline

- Budget impacts on design & construction
  - What is important for the operation?
- Design & permitting impacts on construction timeline
  - Design modifications
  - Weather
  - Change orders
Scale House Example
Scale House Example
Scale House Example
Lessons Learned

- If it can get hit, it will get hit.
- Dimensions are important
- Lots of windows!
- Cameras are a good idea
- Consider your customer & their needs
- Consider future conditions
Questions?

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