Buy Quiet in Construction
NIOSH Meeting, 9-10 November 2011

NYC DEP’s Construction Noise Control
Products & Vendor Guidance Sheet

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Initiative Announcement
First update of NY City’s Noise Code in 30 years

“Operation Silent Night aims to effectively fight and control the loud, excessive noise that plagues too many neighborhoods throughout the five boroughs. This coordinated, multi-agency initiative will specifically target those locations where noise adversely affects our everyday lives so New Yorkers may live, work, and enjoy the City in peace.”

~ Mayor Michael Bloomberg, Oct 2002
Noise Regulation Developers

**New York City Department of Environmental Protection**
- Oversees services for 8 million residents
- Air, water, noise, hazmat pollution
- Charles Shamoon, Assistant Counsel
- [www.NYC.gov/dep](http://www.NYC.gov/dep)

**Parsons Brinckerhoff (PB)**
- Worldwide Engineering Firm
- Transportation and Infrastructure
- Nearly 125 years old; 55,000 staff
- [www.PBworld.com](http://www.PBworld.com)
Prior Work Leading to Regulations

Central Artery/Tunnel Project
Noise Control Program (1995-2005)
Noise Specification 721.560

Federal Highway Administration
Roadway Construction Noise Model (RCNM)
<table>
<thead>
<tr>
<th>Equipment Description</th>
<th>Lmax Noise Limit at 50 ft, dBA, slow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auger Drill Rig</td>
<td>85</td>
</tr>
<tr>
<td>Backhoe</td>
<td>80</td>
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<tr>
<td>Blasting</td>
<td>94</td>
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<tr>
<td>Chain Saw</td>
<td>93</td>
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<td>Compressor (air)</td>
<td>83</td>
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<tr>
<td>Concrete Batch Plant</td>
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<tr>
<td>Concrete Mixer Truck</td>
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<tr>
<td>Concrete Saw</td>
<td>90</td>
</tr>
<tr>
<td>Crane (mobile or stationary)</td>
<td>85</td>
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<tr>
<td>Dozer</td>
<td>85</td>
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<tr>
<td>Excavator</td>
<td>84</td>
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<tr>
<td>Flat Bed Truck</td>
<td>84</td>
</tr>
<tr>
<td>Front End Loader</td>
<td>80</td>
</tr>
<tr>
<td>Generator (25 KVA or less)</td>
<td>82</td>
</tr>
<tr>
<td>Generator (more than 25 KVA)</td>
<td>85</td>
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<tr>
<td>Gradall</td>
<td>73</td>
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</tbody>
</table>

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<tr>
<th>Equipment Description</th>
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<tr>
<td>Grader</td>
<td>85</td>
</tr>
<tr>
<td>Horizontal Boring Hydraulic Jack</td>
<td>80</td>
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<tr>
<td>Hydra Break Ram</td>
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<tr>
<td>Impact Pile Driver</td>
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<tr>
<td>Instu Soil Sampling Rig</td>
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<tr>
<td>Jackhammer</td>
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<tr>
<td>Mounted Hammer (hoe ram)</td>
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<tr>
<td>Paver</td>
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<tr>
<td>Pickup Truck</td>
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<tr>
<td>Pneumatic Tools</td>
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<tr>
<td>Pumps</td>
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<td>Rock Drill</td>
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<td>Scraper</td>
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<tr>
<td>Slurry Plant</td>
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<tr>
<td>Slurry Trenching Machine</td>
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<tr>
<td>Soil Mix Drill Rig</td>
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<tr>
<td>Tractor</td>
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<tr>
<td>Vacuum Excavator (vac-truck)</td>
<td>85</td>
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<tr>
<td>Vacuum Street Sweeper</td>
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<tr>
<td>Vibratory Concrete Mixer</td>
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<tr>
<td>Vibratory Pile Driver</td>
<td>95</td>
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<tr>
<td>Welder</td>
<td>73</td>
</tr>
</tbody>
</table>
NYC DEP Noise Control Strategy

**Proactive**

- Proactive Avoidance of Noise
- Noise Mitigation Plans
- Technical Assistance Available
- Products & Vendor Guidance Sheet

*To guide and assist contractors in finding and selecting quieter equipment and control methods*

**Reactive**

- Reactive Enforcement Ability
- Noise Compliance Limits (FHWA RCNM)
- Stop Work Orders / Possible Fines
Construction Noise Control
Products and Vendor Guidance Sheet

23 March 2007

Distributed by:
New York City Department
Of Environmental Protection

The following is intended to provide guidance to construction contractors with respect to finding and selecting suitable noise control products. These products and vendors may be helpful to contractors for achieving compliance with the New York City Noise Regulations. These items are provided only as suggestions for contractors to consider and should not be construed as an official endorsement of any product and/or vendor by the City of New York. Contractors are free to choose other products/vendors that meet the requirements of such Code. This sheet will be updated from time to time as new noise control technologies gain acceptance.

ACOUSTICAL WINDOWS
- Harney Industries Acoustical Windows
- Harney Industries Quiet Window
- Soundproof Windows

WHITE NOISE MACHINES
- Mapac Sound Screen
- Speech Privacy Systems Sonet System

PILE DRIVERS
- Niv-Jet Still Wacker
- Ohlson Silent Pile

DOZERS
- John Deere 450H, 550H
- Caterpillar D6R III

LOADERS
- Volvo 150E
- John Deere 4441
- Caterpillar 950

CRADERS
- Caterpillar 19H, 12E, 12F, 140

SCAPERS
- Caterpillar 613

BACKHOES
- Caterpillar 420D, 410D
- John Deere 410G
- Case 680C

EXCAVATORS
- John Deere 35D
- Caterpillar 307C

TRACTORS
- John Deere 210G
- Caterpillar 621G

HOE RAMS
- Chicago Pneumatic CP 100, CP 400
- Allied Hammerhead
- Allied-Rammer City Series

SKID STEERS

BACKUP ALARMS
- Pio Electronics 200 Series, 45 Series, 6000 Series
- Ecco Group Smart Alarms, 500 Series, 700 Series
- Grete Industries Model 70040
- Brigade Electronics BBS-TEK Series

JACKHAMMERS
- Better World Gentle Jack
- Atlas Copco TEX P8 Series
- Chicago Pneumatic CP 1240-5
- Makita Makita HM1810

VACUUM EXCAVATORS (VAC-TRUCKS)
- Gauder LR ACL
- GapVax HV Series

NOISE BARRIERS
-ansonite Sound Barrier
- Sound Fighter LSE Sound Barrier
- Kinetics Noise Block
- one inch plywood is rated at 30 SFC.

NOISE CURTAINS
- Sound Seal BBC 13-2
- Illbruck Acoustic SONEX Curtain
- McGill Acoustic Fibersorb Curtains

SILENCERS & MUFFLERS
- Universal Sound Universal Mufflers
- Burgess Muffling Silencers
- Burgess Muffling Silencers
How to get on “the list”

Any construction equipment may be used in NYC providing it meets DEP’s noise emission limits

1. Have equipment Lw or Lp tested in accordance with standards
2. Submit results to Charles Shamoon (NYC DEP) or Erich Thalheimer (PB)
3. Will be rank ordered by Lw or Lp
4. Quietest several will be featured on the Products & Vendor List
5. List updated as appropriate
# Equipment Sound Level Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
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<tbody>
<tr>
<td>SAE J88</td>
<td>Society of Automotive Engineers Standard J88</td>
</tr>
<tr>
<td></td>
<td>Sound Measurement of Off-Road Work Machines</td>
</tr>
<tr>
<td>SAE J1805</td>
<td>Society of Automotive Engineers Standard J1805</td>
</tr>
<tr>
<td></td>
<td>Sound Power Level Measurements of Work Machines</td>
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<tr>
<td></td>
<td>Noise Emission in the Environment by Equipment for use Outdoors</td>
</tr>
<tr>
<td>ISO 3744</td>
<td>International Standards Organization 3744</td>
</tr>
<tr>
<td></td>
<td>Determination of sound power levels using sound pressure</td>
</tr>
<tr>
<td>ISO 4872</td>
<td>International Standards Organization 4872</td>
</tr>
<tr>
<td></td>
<td>Measurement of noise emitted by construction equipment used outdoors</td>
</tr>
<tr>
<td>ISO 6395</td>
<td>International Standards Organization 6395</td>
</tr>
<tr>
<td></td>
<td>Measurement of exterior noise emitted by earth-moving machinery</td>
</tr>
<tr>
<td>ANSI S12.23</td>
<td>American National Standards Institute S12.23</td>
</tr>
<tr>
<td></td>
<td>Method for determination of sound power emitted by machinery/equipment</td>
</tr>
<tr>
<td></td>
<td>Determination of sound power levels of noise sources using sound pressure</td>
</tr>
<tr>
<td></td>
<td>[Various Methods: anechoic, hemi-anechoic, reverberant, comparison]</td>
</tr>
</tbody>
</table>
Sound Level Metrics

- **Lw - Sound Power Level**
  - Characteristic of the source
  - Independent of environment
  \[ Lw = 10 \log \left( \frac{W}{W_0} \right) \quad W_0 = 1\text{pW} \]

- **L_I - Sound Intensity Level**
  - Power per unit area
  - Vector quantity with magnitude and direction
  \[ L_I = 10 \log \left( \frac{I}{I_0} \right) \quad I_0 = 1\text{pW/m}^2 \]

- **L_p - Sound Pressure Level**
  - What humans hear
  - Depends on environment
  - Measureable
  \[ L_p = 10 \log \left( \frac{P}{P_0} \right)^2 \quad P_0 = 20\mu\text{Pa} \]
Sound Power Determination

- Able to compute sound POWER from PRESSURE measurements
- Controlled acoustic environment
- Anechoic or Reverberant
- Multiple Lp measurements averaged over surface area
- Or comparison to a Reference Sound Power Source (fan)
Benefits of “the list”

- Provides a good starting place for contractors to find quieter equipment and noise control products
- A positive example of NYC DEP working constructively with those affected by noise regulation
- Eliminates contractor’s excuse of “no such equipment exists”
- Provides competitive commercial pressures for manufacturers to make quieter equipment to be seen on “the list”
Industry and Public Reaction

- Winner - 2010 NIOSH/NHCA Safe-In-Sound Award
- Winner - 2009 ACEC Silver Award
- Hundreds of articles in the US, Britain, India, Russia, China
- Television, Radio, Internet press
- Technology for a Quieter America National Academy of Engineering
InterNoise 2012 will be in NYC

- Quieting the World’s Cities
- Plenary Session featuring NYC Noise Code
- August 19 - 22, 2012
- Marriott Marquis in Times Square
- Website: www.internoise2012.com