

Local Ordinance Targeted to Low-Frequency Noise

Bennett M. Brooks, PE

Brooks Acoustics Corporation

27 Hartford Turnpike, Vernon, CT 06066 USA

1-800-817-5831

bbrooks@brooks-acoustics.com

www.brooks-acoustics.com

**Paper 4pNSa1 - Presented at the 138th Meeting
of the**

Acoustical Society of America

Columbus, Ohio

4 November 1999

LOW-FREQUENCY NOISE

Major cause of residential disturbance

What sources cause low-frequency noise?

How does it affect the residential environment?

What will be the official response?

LOW-FREQUENCY NOISE SOURCES

Some Examples:

- Industrial uses**
- Power industry (engine) installations**
- Manufacturing**

- Commercial uses**
- Mechanical (HVAC/refrig) systems**
- Entertainment (musical) sources**

LOW-FREQUENCY NOISE EFFECTS ON RESIDENCES:

- Intermittent disturbance of residents**
- Continuous disturbance of residents**
- Noise induced vibration of housing structure**

OFFICIAL RESPONSE TO LOW-FREQUENCY NOISE VARIES:

- No response**
- Attempt to regulate using overall level limits**
 - A-weighted level**
 - C-weighted level**
- Band level limits**

CASE STUDY - BAND LEVEL LIMITS

- Town authorities requested help**
- Determined a need to regulate low-frequency noise**
- Complaints from residential community near sports bar - offers musical entertainment**
- Desire to develop universally applicable (non-specific) objective regulation**

BAC asked to develop noise limit criteria

- **Must address low-frequency noise**
- **Must be objective**
- **Must be easily enforced (procedures)**
- **Must be approved by State DEP**
- **Metrics studied:**
 - A-weighted level (dBA)**
 - Octave band levels**
 - One-third octave band levels**

Selection of band limit levels

Consider state mandated A-weighted limits

- **State limits depend upon:**
 - Land use
 - Day or night hours
- **Select octave band limits such that:
Summed band level limits equal
A-weighted limits**

Selection of band limit levels

Existing State of Connecticut and Local A-weighted Overall Level Limits

<u>Emitter</u>	<u>Receiver</u>	<u>Day</u>	<u>Night</u>
Industrial	Residential	61	51
Commercial	Residential	55	45

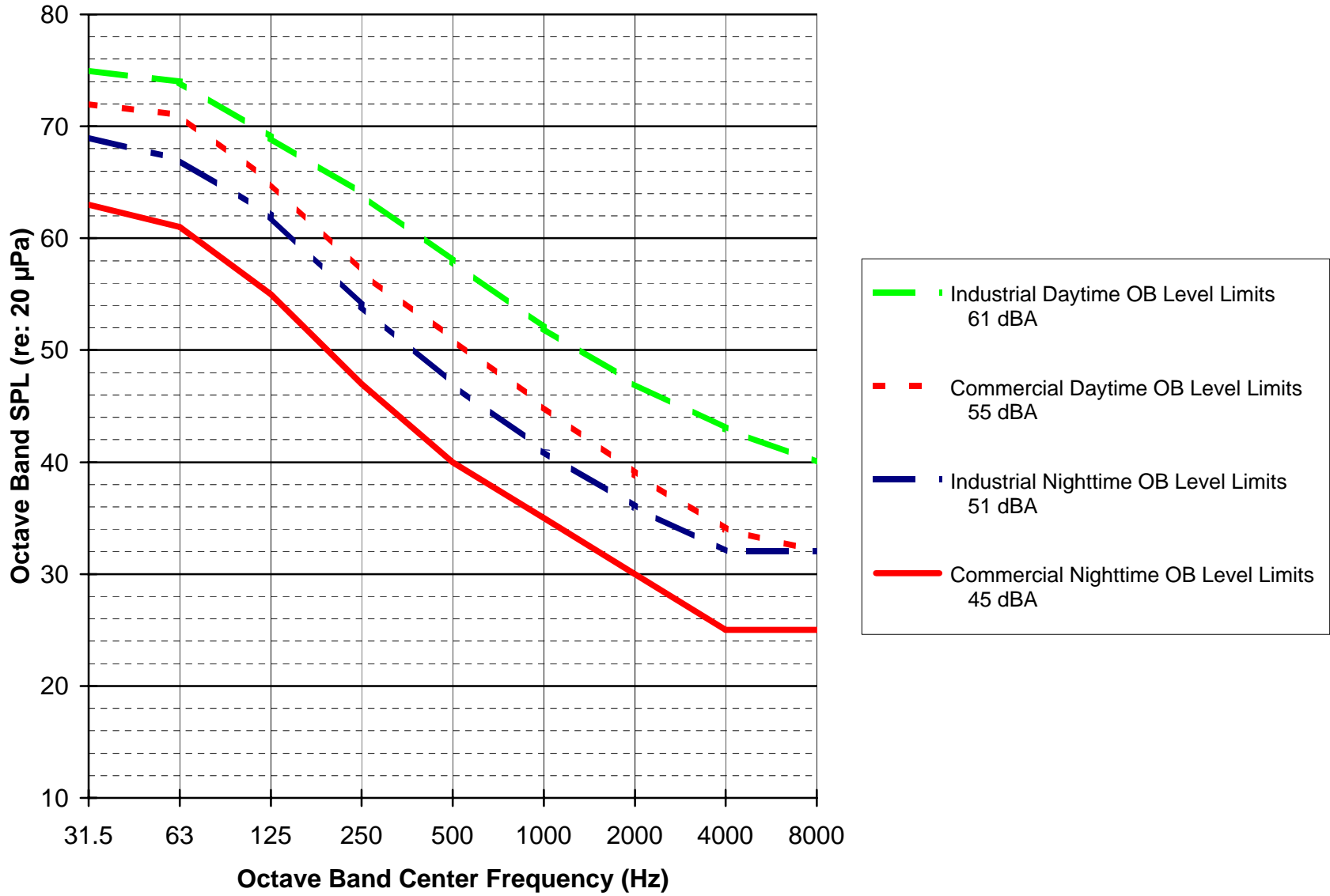
Selection of band limit levels

Consider noise emitter sources which contain excessive low-frequency content

- **Hypothetical case 1**
 - Emitter exceeds A-weighted level limits
- **Hypothetical case 2**
 - Emitter meets A-weighted level limits

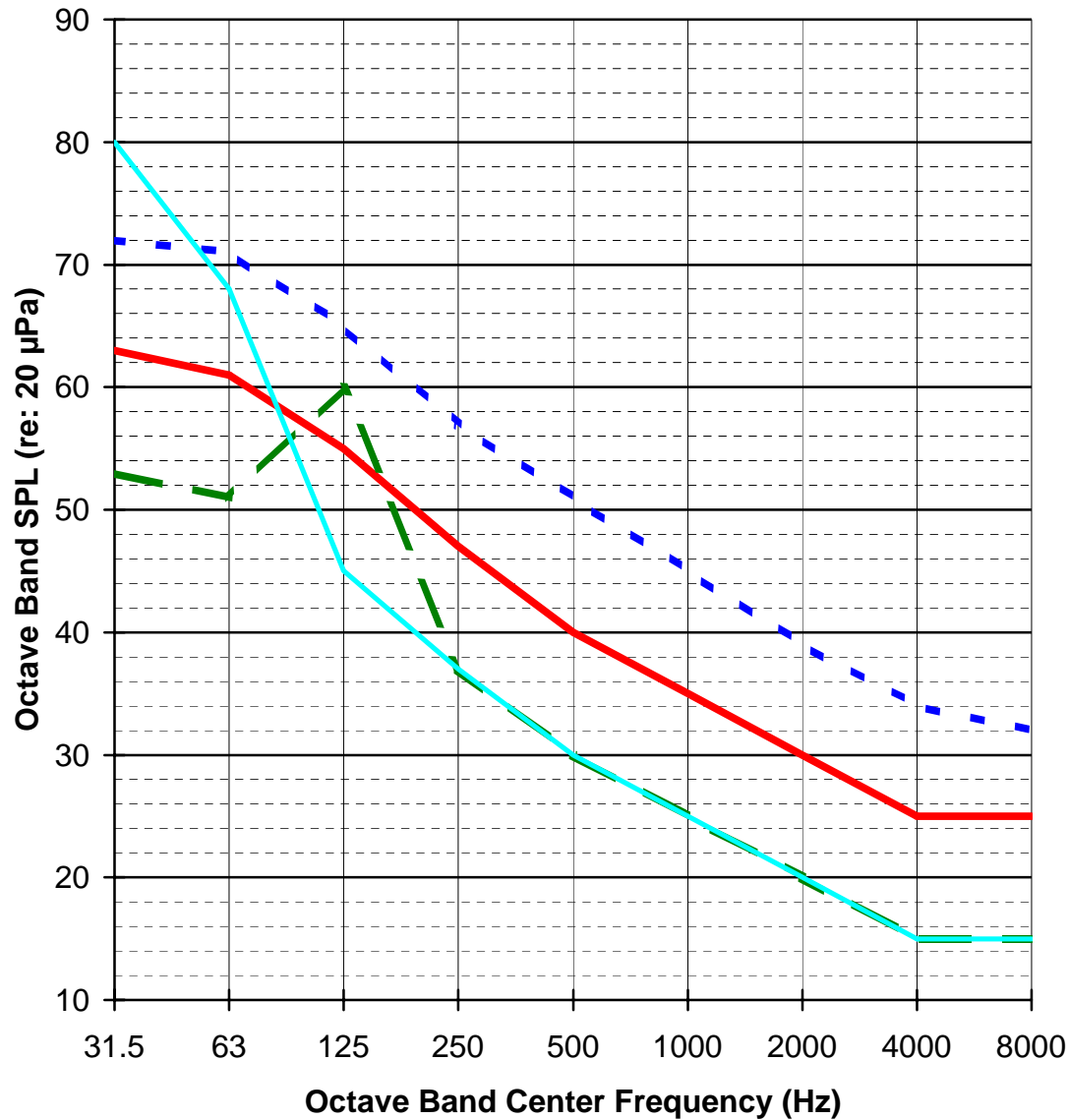
Octave Band Noise Level Limits

Industrial and Commercial Emitters



Octave Band Noise Level Limits

Commercial Emitter to Residential Receiver



Comparison with Hypothetical Low-frequency Noise Emitters

- Daytime OB Level Limits, 55 dBA
- Nighttime OB Level Limits, 45 dBA
- Hypothetical Emitter 1, 44.2 dBA
- Hypothetical Emitter 2, 44.2 dBA

Octave band limit study technical results

- **Octave band limits apply objective criteria to varied low-frequency problems**

- **Hypothetical emitter**

 - Could be in compliance with A-weighted overall noise limits**

 - Could at same time be in violation of octave band noise limits**

CONCLUSIONS

Octave band noise limits - Implementation

- **Octave band noise limits integrated into existing Town noise ordinance and adopted by Board of Selectman**
- **Revised Town noise ordinance approved by State DEP and enacted into law**
- **Police Department purchased RTA and received training for 5 Officers**
- **Addressed one incident - Prepared for more**