Audio Engineering Society

Melbourne Section

Sound Level Management, a ground-up approach

Dr. Johannes Mulder (Jos)

Murdoch Uni

Perth, WA

Murdoch UNIVERSITY

http://audioengineering.co/ngg_tag/audio-funny-stuff/nggallery/thumbnails

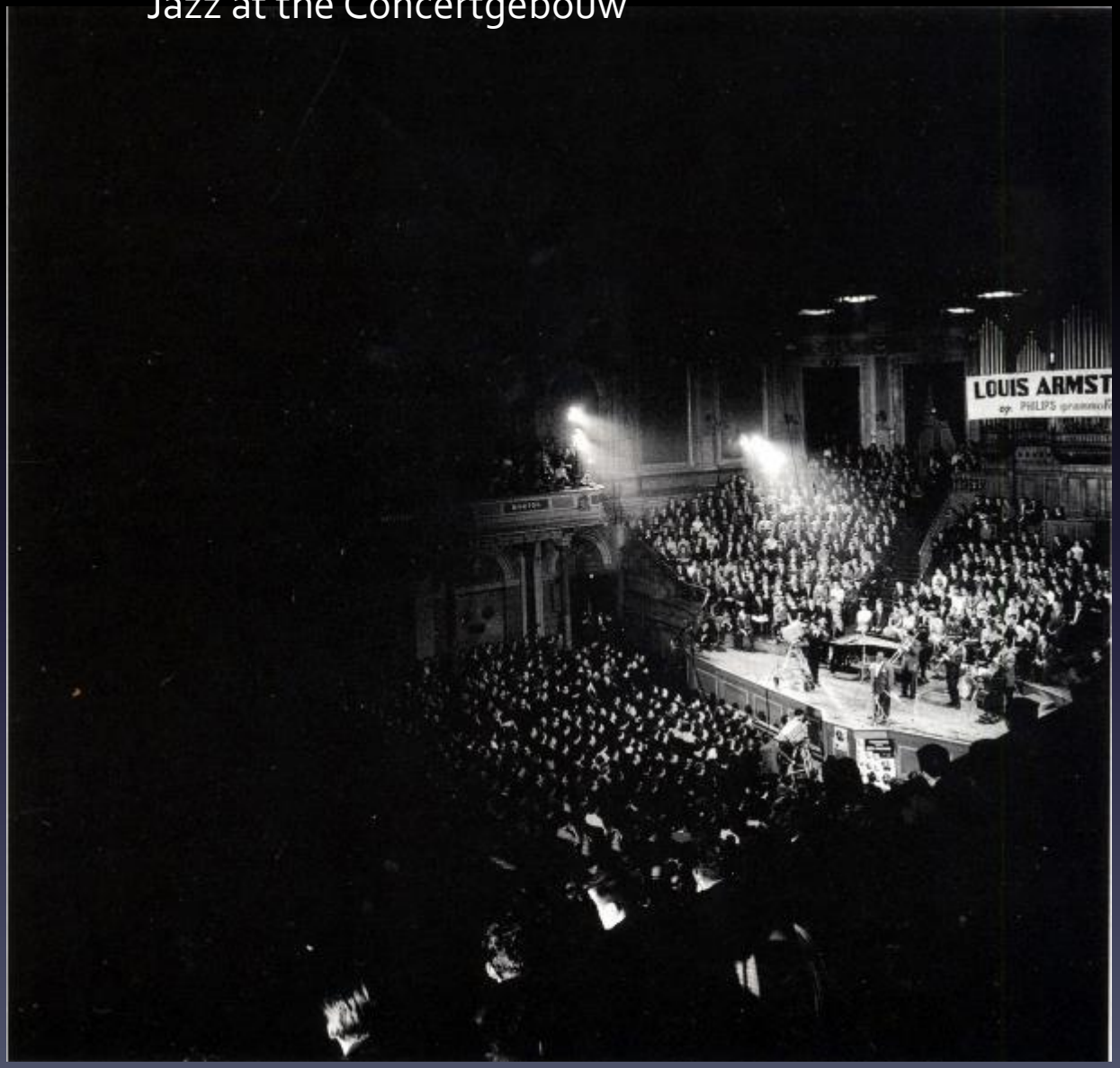
Facebook user Radek Bach (Poland)

ME

- Tonmeister (The Hague 1991-1996)
- 1995-2010 Free Lance Live Sound Engineer
- 2008 Master Arts Management and Admin
- 2013 PhD (UTS)
- 2013-ongoing Murdoch Uni, School of Arts

Master's Thesis

Jazz at the Concertgebouw



Netherlands

- Hearing Covenant (2011)
  - Between stakeholders , not in law.
- 103db(A) over 15 Minutes
  - Peak max = 140db(C)
- Requirement to log and retain
- Evaluated next in 2017

Other Examples

- Belgium leq=100 db(A) over 60m
- With 'headroom' leq 102 dB(A) over 15m
- Germany leq=99db(A) over 120m
- And 102db(A) over 30m

Decibel Banking

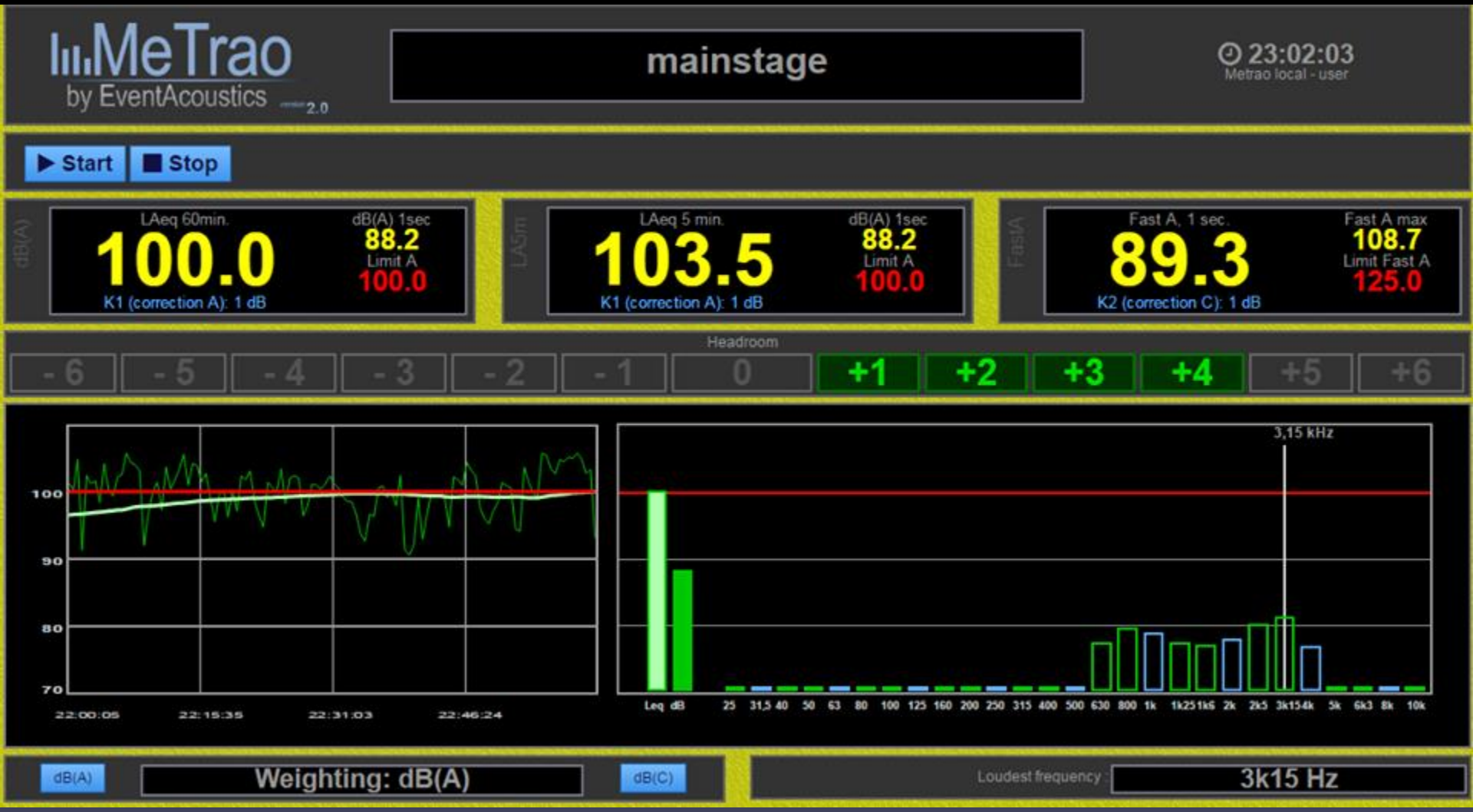
10EaZy is designed to avoid this situation!

With the MAM, the sound engineer is constantly informed about the current sound levels impact on the Leq value. He can then mix the show focusing on quality of sound instead of worrying about a dB limit. Very often the sound engineer knows the band playing, and as such the dynamic of their performance.
10EaZy offers a "bank account" approach, in which some "dB money" is put into the account, and then the sound engineer withdraws them at a rate proportional to the sound level he is playing at. It is thus possible for the sound engineer to withdraw money at a rate which is higher than the income, equalling playing louder than the average dB limit, but this will only be allowed for a limited period of time after which he will need to withdraw at a rate lower than the income.

http://www.10eazy.com/introduction/10eazy-in-live-sound/

Metrao

- Event Acoustics (NL)
- Involved in Hearing Covenant
- Multi stage festival
  - Sound Guarding
- Using Correlation
  - To separate stages
  - Filter out other noise sources (air traffic, loud audiences)

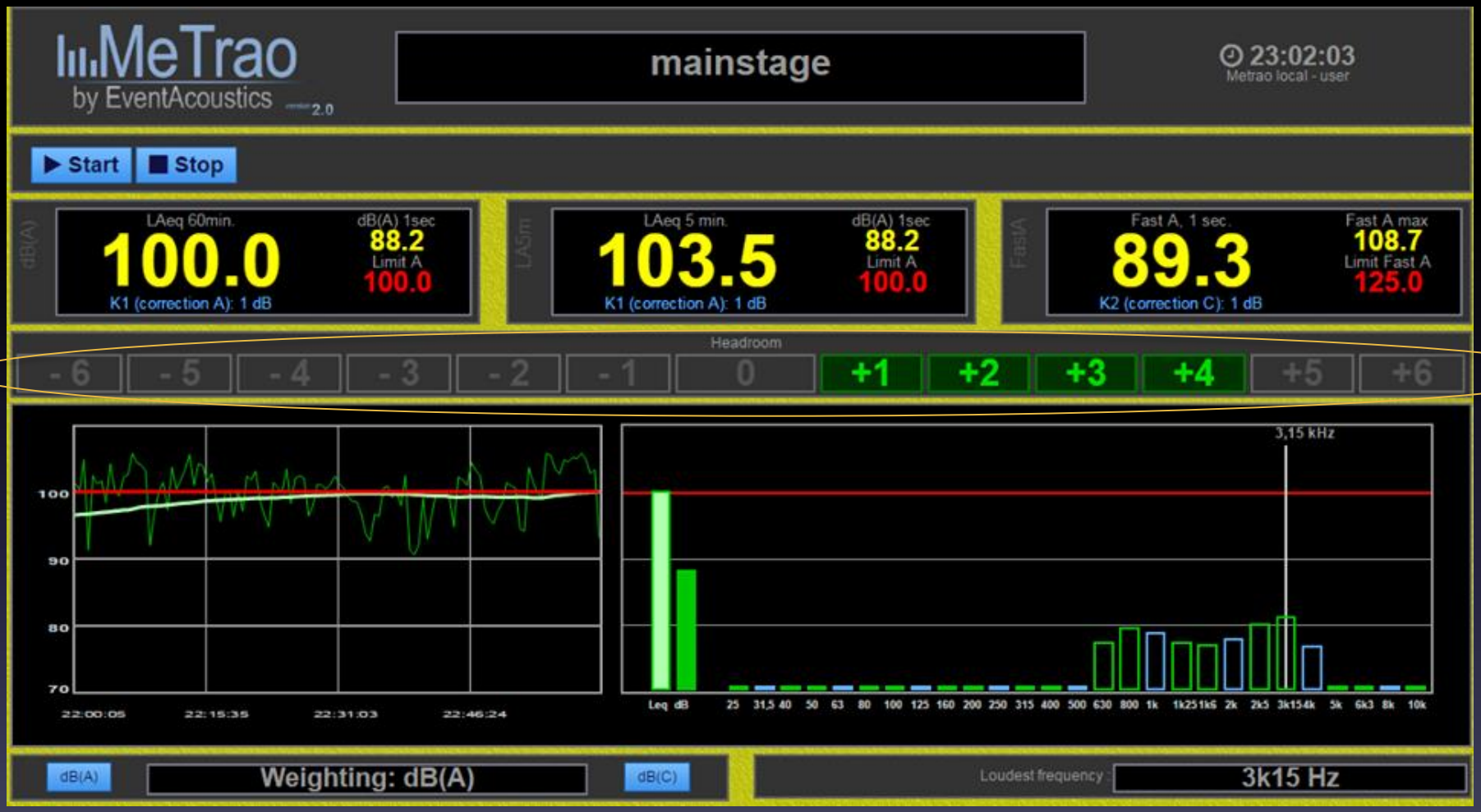

MeTrao
by EventAcoustics
2.0
mainstage
23:02:03
Metrao local - user
Start
Stop
LAeq 60min.
100.0
K1 (correction A): 1 dB
dB(A) 1sec
88.2
Limit A
100.0
LAeq 5 min.
103.5
K1 (correction A): 1 dB
dB(A) 1sec
88.2
Limit A
100.0
Fast A, 1 sec.
89.3
K2 (correction C): 1 dB
Fast A max
108.7
Limit Fast A
125.0
Headroom
- 6
- 5
- 4
- 3
- 2
- 1
0
+1
+2
+3
+4
+5
+6
100
90
80
70
22:00:05
22:15:35
22:31:03
22:46:24
3,15 kHz
Leq dB
25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1k 1k25 1k6 2k 2k5 3k15 4k 5k 6k3 8k 10k
dB(A)
Weighting: dB(A)
dB(C)
Loudest frequency :
3k15 Hz

Metrao Multi stage festival Sound Level Competition
Source: [Facebook]

- From Denmark made by Jacob Navne
- Former Touring Engineer
- Named after EU directorate 10EC that describes the OH&S hearing regulations

Navne, Jacob. 2015. "Sound Level Measurements Made Eazy: 10Eazy–Intuitive SPL Monitoring for Live Sound Events." Audio Engineering Society Conference: 58th International Conference: Music Induced Hearing Disorders, Aalborg.

Your Venue
FAST dBA
103,3
-6
-5
-4
-3
-2
-1
+1
+2
+3
+4
+5
+6
LAeq the last 15 minutes
100,9
103
102
101
100
99
View /Edit Running Order
Quit 10EaZy
Input Peak
Current dB limit
LAeq 15 min @ 103dBA
System information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dB(C)
Loudest frequency :
3k15 Hz

Avoiding conflict

- Short term measurement requires short term engagement (policing)

- Average (e.g. 15 min) term affords dialogue, appropriate interfaces (10EaZy, Metra0) facilitate this.

Stakeholders

- Audiences
- Venues
- Artists
- Sound Engineers
- Neighbors
- City Councils
- Consultancy
- Sound Hire
- Hearing Conservation
- EPAs

Lot of weight put on interactions at mixing desk before and during concert

CAESIE
CONNECTING AUSTRALIAN EUROPEAN SCIENCE AND INNOVATION EXCELLENCE

Australian Government
Department of Industry and Science

European Commission

SoundCheck Symposium RMIT 10 April 2015 still frame from video
Marcel Kok, Jos Mulder, Lawrence Harvey, Jon Perring

Marcel Kok

dB control

Event noise monitoring & research

dB control

CAESIE

RMIT University | Spatial Information Architecture Laboratory

Murdoch University

waapa

Australian Edith Cowan University

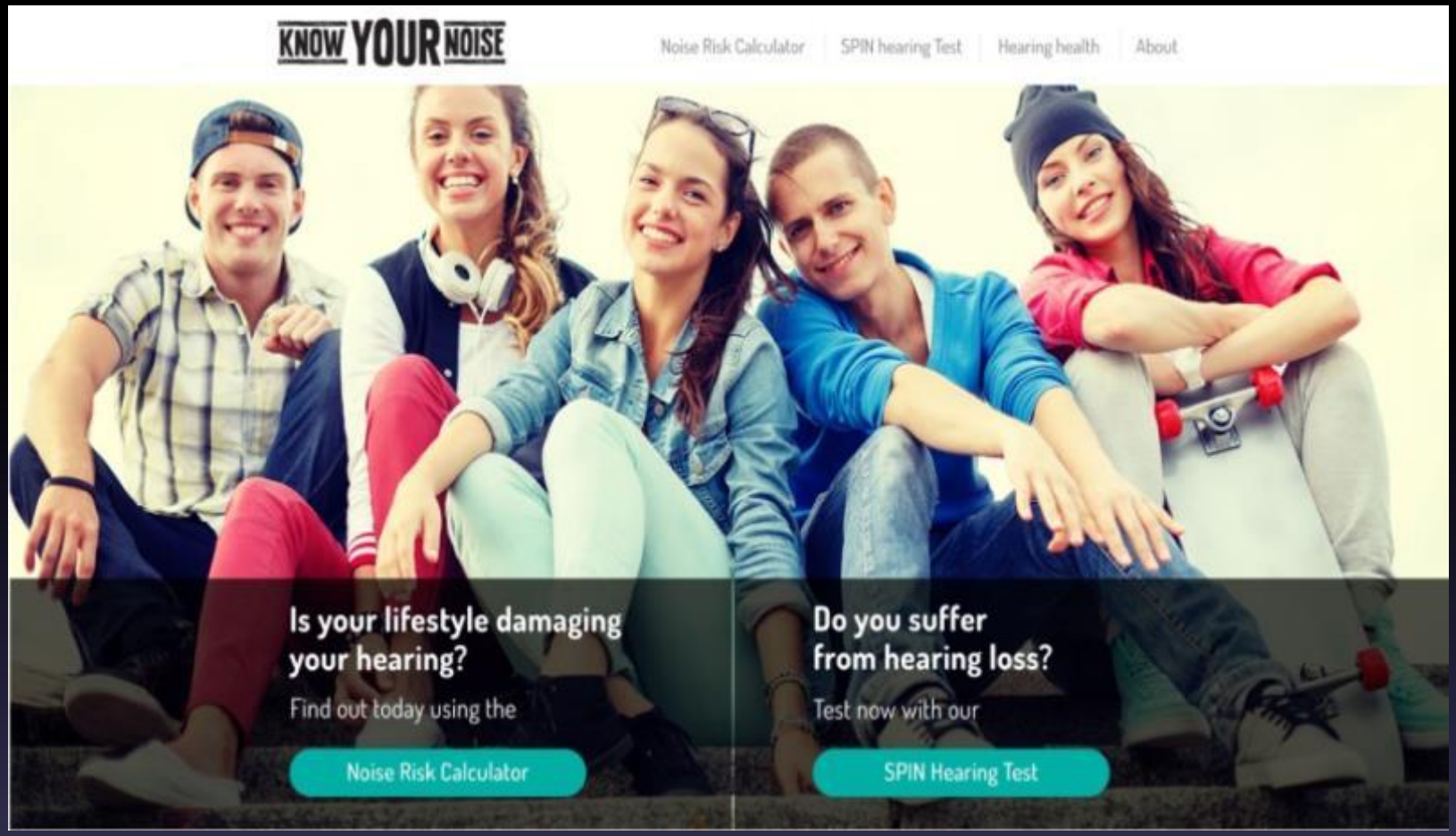
Musician's concerns

- Fear for *nanny state* regulations nudging closer to OH&S maxima
- What about bands that cultivate loudness?
- Sunn-O))) for instance

Image from www.metalinjection.com

Hearing CRC

- Hearing advocacy, new ventures
- Siobhan Mcginnity's PhD co-supervision


KNOW YOUR NOISE
Noise Risk Calculator
SPIN hearing Test
Hearing health
About
Is your lifestyle damaging your hearing?
Find out today using the
Noise Risk Calculator
Do you suffer from hearing loss?
Test now with our
SPIN Hearing Test

KNOW YOUR RISK AND TAKE
ACTION
TO PREVENT HEARING LOSS.
HEAR smart

knowyournoise.nal.gov.au

STEP 1

Your Lifestyle

Tell us which leisure activities you do, and whether you're exposed to loud noise at work

STEP 2

Leisure Time

For the leisure activities you do most often, tell us how much time you spend on them and whether you wear hearing protection

STEP 3

Work Time

Tell us how much time you spend in noisy environments at work, and how often you wear hearing protection

STEP 4

Results

Find out which activities expose you to the most noise, and receive your overall risk rating

Experiment
Explore how changes in your lifestyle could affect your hearing risk

Send me my results
Get your results emailed to you, so you can keep a record of your personal noise exposure

Contribute to science
Add your results to our research study on noise exposure in Australia

Noise Calculator

AUDIO
AES
58TH AES CONFERENCE
AALBORG, DENMARK
Sunday, June 28 - Tuesday, June 30, 2015
Music
Induced
Hearing
Disorders

58thConference.pdf (page 4 of 6)

Esther Kois-Merz.

the basics of sound engineering so that the audiologist can better translate the patient's description of the listening experience and make better adjustments to the parameters in the hearing aid. This is particularly useful when fitting hearing aids for users listening to music and musicians.

SOUND LEVEL MANAGEMENT AND CONTROL

Johannes Mulder presented the first of three talks related to stakeholders at live concerts. Not only musicians and concert attendees, but also the sound reinforcement industry, local authorities, event planners, and the local community are stakeholders at live concerts. Mulder's presentation provided a sociological perspective of the dynamics and outlined the impor-

Johannes Mulder

sound engineers that may be forced to produce high level sound, and abstain from hearing protection in spite of the known risks. Hearing protection is, for fair reasons, considered an impediment for ensuring the quality. The discussion also touched on the need for better education and training by professionals in the field, and general mediation of knowledge to concert participants. Most know what sound pressure level means, but don't understand the signifi-

Panel discussion: from left, Jacob Navne (Denmark), Marcel Kok (Netherlands), Thomas Lund (Denmark), Michael Santucci (U.S.), and Johannes Mulder (Australia).

JAES_V64_3_PG124.pdf (page 1 of 8)
Search

JOHANNES MULDER, *AES Member*
(j.mulder@murdoch.edu.au)

School of Arts, Murdoch University, Perth, Western Australia

Music induced hearing disorders and noise pollution emerge on the crossroads of technology, culture, and society. This paper argues that multidisciplinary approaches are required to reduce hearing risks at music concerts and related problems of noise pollution. The paper segues from a broad to a narrow perspective looking at the interactions between stakeholders "on the floor." The paper argues that even though noise regulations and hearing risk mitigation policies may be different between nations and states, best practices originate from procedures and policies that are developed from an understanding of the multiple stakeholder perspective and that facilitate dialogues between the different agents involved.

0 INTRODUCTION

At live music concerts many different perspectives on sound pressure level (SPL) come together. This can be exemplified by listing the stakeholders: audiences, musicians, venues, promoters, agents, sound hire companies, sound engineers, hearing risk advocacy, occupational and health safety (OHS) agencies, and, last but not least, the neighbors. A rock band may have the desire to "be" loud from an equally aesthetic as well as experiential ideal; their representative sound engineer at the mixing desk is, or should be an ambassador for those ideas. The system's engineer or host at that mixing desk can be seen as a representative of the venue who are (often) legally bound to adhere to certain limits, either from OHS, environmental regulation or a voluntary limit set by the venue. Audiences, ranging from headphone as a trump) and, at the same time, into the public sphere, as a consequence of the increased levels.

In this paper I want to tease out the interactions between the perspectives listed above in order to reinterpret the options for the different stakeholders as agents with regard to the issue of sound level management. Combining a discussion of existing literature from a number of academic and scientific disciplines with some of my own experiences as a live sound engineer, I will argue that common issues of live amplification, hearing damage risk, and disturbance of local soundscapes need to be addressed in a single strategy, even though different regulations may be in force. Live concerts play a vital role in the current day cultural economy in particular since revenues are on par or have overtaken the recorded music industry [1, 2]. Its sustainability needs to be ensured by empowering stakeholders to cooperatively

All engineers are the best engineer

Facebook: Stagehand Institute of Technology (SHIT)

AudioTechnology
THE MAGAZINE FOR SOUND ENGINEERS & RECORDING MUSICIANS

TIME TO SHELVE THE LOW END

Published On February 10, 2015 | ***Tutorials***

Why so many concerts are being wrecked by too much low-end and what to do about it.

Text: *Howard Page*

I've enjoyed a long career where I've been lucky enough to mix concert sound for the likes of Sting (both with and without a 60-piece orchestra!), Van Halen, Sade, Phil Collins, The Bee Gees, James Taylor, Paul Simon, Mariah Carey, Paul McCartney and in earlier times Billy Thorpe and the Aztecs plus many, many others. Now, in my role as Senior Director of Engineering at Clair Global I don't get to actually tour as much as I used to but I find myself

bobbyowsinski.blogspot.com.au

THE BIG PICTURE
Music Production Blog
Bobby Owsinski's Inside Look At Music Engineering And Production

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Take Your Mixes To The Next Level

Thursday, January 14, 2016

Why Do Concerts Sound So Bad?

Most every time I go to a concert I come with the same feeling - why did it sound so bad?

Bobby Owsinski is a producer/engineer, author and coach. He has authored 23 books on recording, music, the music business and social media.

The Big Picture Music Production Blog features a new post every weekday.

Named one of the Top 100 Music Blogs

TOP 100 MUSIC INDUSTRY BLOGS
MUSICIANS EMPOWERED

Never just the person at the desk

- System (PA + Room Acoustics)
- Backline/Monitors (Guitar amps aimed at FOH?)
- Audience singing along
- Threshold shift (TTS)? Multiples?

Audiences not always passive

- "Mercredi soir, lors du concert de Stromae, les cris du public, notamment des jeunes filles émues, montaient le niveau jusqu'à 108-111 décibels", s'amuse André Crousaz, responsable des relevés sonores au Paléo Festival de Nyon.

After parties, save your voice!

- At festivals late night parties
- DJs advised to **not** play songs that are likely to be sung along to
  - Anecdotally from Lowlands festival (NL)

Regulation

- Generally informed by environmental regulation and or by permit
- OH&S only applies to venue staff
  - What about musicians and sound engineers?
  - Compare situation in orchestras

Regulation

- E.g. Agent of Change
- Support for acoustic improvement
  - Risk: invites increases in sound levels if possible.
- Frameworks need top down as well as ground up approach

Work to be done!

- Loudness
- Tod and Cody 1999 *R&R threshold*
- dB(A) time to move one?
- What about dB(C)
  - Marcel Kok (PhD project UGent)
- What about LUFS and K-Weighting?

Todd, N., and F. Cody. 1999. "Vestibular responses to loud dance music: A physiological basis of the ''rock and roll threshold''?" *J Acoust Soc Am* 107 (1):496. doi: http://dx.doi.org/10.1121/1.428317.

Work to be done!

- Relation between loudness perception and distortion? (Durbridge 2015)
- What about limiting
  - Reduces average loudness (and dynamic range)
  - Distortion introduced by limiters?

Durbridge, Simon E, Adam J Hill, and John Taylor. 2015. "The effects of distortion on the perception of loudness in live sound." Proc. of Institute of Acoustics Conference on Reproduced Sound.

Does dB banking even work?

- Longitudinal Study
- Trial run at Yah Yah's
- Anecdotal from Netherlands
  - 103dB/15m is too much

Dynamic Range

- Can the decibel banking I/F be used to increase dynamic range?
- Support engineer and artists to plot loudness over duration of concert

Strategies

- Responsible Serving Certification
- Mentoring programs for smaller venues and venues relying on volunteers
- Curriculum design tertiary education providers
- Musician's responsibility
  - Hearing protection on stage?
  - With increased on-stage levels as a result?

Where next

- Develop set-list app
- Trial a mentoring program
- Keep networking and building momentum
- Teach lots of undergrads

THANK YOU!