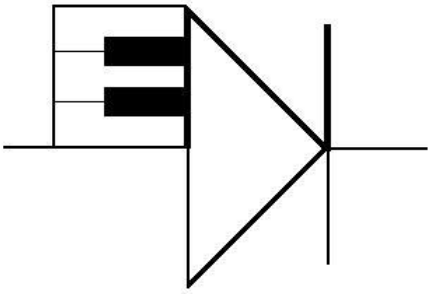

ELECTRONOTES

WEBNOTE 60 8/1/2021

ENWN-60

More on “The Hum” as LF Tinnitus

-by Bernie Hutchins

Below is a compilation of this topic from April 2021 from the SYNTH-DIY and World-Wide Hum websites:

1. REPLY
2. **Bernie Hutchins**

APRIL 28, 2021 AT 8:24 PM

WWH – SDIY

With regard to asking for Expert Help – there exists a body of expert audio engineers (music synthesizer designers – good ears) on their SYNTH DIY site archived here:

https://synth-diy.org/pipermail/synth-diy/

If you are curious click on April 2021 and sort by “author” and scroll to my postings. Since a current topic was “tinnitus” I saw an opportunity to fish for possible input on LF tinnitus (The Hum). Here is what I posted on SDIY on April 24, 2021:

“LF Tinnitus ???

“Since the subject of “ordinary tinnitus” (HF; say 5 kHz – 10 kHz) has appeared here as a topic, please humor me in allowing mention of the “World-Wide Hum” (WWH, sometimes Taos Hum, etc.) which is a mysterious LF hum (like an idling diesel engine in the distance – perhaps 30 Hz to 100Hz – I hear 64 Hz), often 24/7/365, the exact nature and cause of which is largely unknown.

“Few people hear this (perhaps 2%), but observations are confounded by real trucks, refrigerator units, failing power transformers, etc., as well as (conspiracy directed) entertaining suggestions of government mind-control or underground invasion tunnel drilling, cell towers, etc. Few good audio engineers are hearers and participating investigators.

“This Hum is likely an individually generated (internal) artifact – not a real physical sound; a LF tinnitus. Importantly and diagnostically, various “impulsive” INDIVIDUAL ACTIONS (vigorous head-shake, exhale, grunt) seem to interrupt the WWH for about ½ a second, after which it is found to have ramped back up. This ramp-back-up timing reminds an audio engineer of AGC, which in turn might suggest actions of protective muscles in the middle ear (supposition here).

“For those interested, Dr. Glen MacPherson maintains an excellent website on the WWH:

https://hummap.wordpress.com/

and I have posted on my EN site Webnotes linked here:

http://electronotes.netfirms.com/ENWN56.pdf

-Bernie”

****

Among the replies was this from frequent SDIY contributor Richie Burnett (many thanks)(also April 24):

“I think I’ve heard about the Tensor Tympani Muscle being implicated as a
possible cause for this. It’s a muscle that normally contracts to reduce the sensitivity of the ear in the presence of loud sounds, (a sort of AGC), but the process can malfunction leading to a range of symptoms classed as “Tensor Tympani Syndrome”.

https://en.wikipedia.org/wiki/Tensor_tympani_muscle

”It mentions that muscle contraction produces noise… “Fast twitch fibers
produce 30 to 70 contractions per second (equivalent to 30 to 70 Hz sound frequency)”. Some people hear rumbling if they close their eyes really tight, etc.

. . . . . .

-Richie,”

****

Of considerable interest here is how this corresponds to our ongoing speculation regarding The Hum and AGC due to middle-ear muscles: (1) The frequency range of 30-70 Hz, and (2) the time responses of the protective muscles reproduced from Wiki below :

which show the ½ second delay in the ramp-up which is just what we observe.

-Bernie

REPLY

3.  **George G.**

MAY 10, 2021 AT 1:01 AM

Well done Bernie, and thank you Ritchie.

Your latest post ticks many boxes, perhaps all of them?

Maybe Glen can now classify this phenomenon as “probably solved” and take that long deserved break back to the quite life??

Cheers everyone, it’s been a great journey.

REPLY

-  **Dr. Glen MacPherson**

  MAY 10, 2021 AT 4:01 PM

  I think that’s premature at this point, but progress is certainly being made!

  REPLY

-  **Bernie Hutchins**

  MAY 13, 2021 AT 6:04 PM

  Thanks George,

  To a large extent, I concur with your assessment: – the extent limited to aspects of THE HUM relates to the satisfaction of my own basic CURIOSITY about its origins (internal – middle ear) while remaining elusive with regard to RELIEVING AFFLICTIONS for others that are far more annoying than my own.

  -Bernie

  REPLY

4. **George G.**

MAY 14, 2021 AT 3:29 AM

Hi Bernie,

Yep, message received and understood, many thanks.

Oh, I might add, for the past two weeks I have had a middle ear infection in my right ear.(My hum ear) Haven't heard the Hum for two weeks.

Cheers mate, feel free to call in for a beer or a cuppa tea whenever you visit OZ.

And here is the SDIY equivalent:

Bernard Arthur Hutchins, Jr bah13 at cornell.edu
Sat Apr 24 22:35:25 CEST 2021

- Previous message (by thread): [sdiy] tinnitus (WAS Lossless synthesizer demos)
- Next message (by thread): [sdiy] tinnitus (WAS Lossless synthesizer demos)
- **Messages sorted by:** [date] [thread] [subject] [author]

LF Tinnitus ???
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Few people hear this (perhaps 2%), but observations are confounded by real trucks, refrigerator units, failing power transformers, etc., as well as (conspiracy directed) entertaining suggestions of government mind-control or underground invasion tunnel drilling, cell towers, etc. Few good audio engineers are hearers and participating investigators.
This Hum is likely an individually generated (internal) artifact – not a real physical sound; a LF tinnitus.
Importantly and diagnostically, various "impulsive" INDIVIDUAL ACTIONS (vigorous head-shake, exhale, grunt) seem to interrupt the WWH for about ½ a second, after which it is found to have ramped back up. This ramp-back-up timing reminds an audio engineer of AGC, which in turn might suggest actions of protective muscles in the middle ear (supposition here).

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http://electronotes.netfirms.com/ENWN56.pdf

-Bernie

[sdiy] tinnitus (WAS Lossless synthesizer demos)

Richie Burnett rburnett at richieburnett.co.uk
Sat Apr 24 23:48:28 CEST 2021

- Previous message (by thread): [sdiy] tinnitus (WAS Lossless synthesizer demos)
- Next message (by thread): [sdiy] tinnitus (WAS Lossless synthesizer demos)
- **Messages sorted by:** [date] [thread] [subject] [author]

I think I've heard about the Tensor Tympani Muscle being implicated as a possible cause for this. It's a muscle that normally contracts to reduce the sensitivity of the ear in the presence of loud sounds, (a sort of AGC,) but the process can malfunction leading to a range of symptoms classed as "Tensor Tympani Syndrome".

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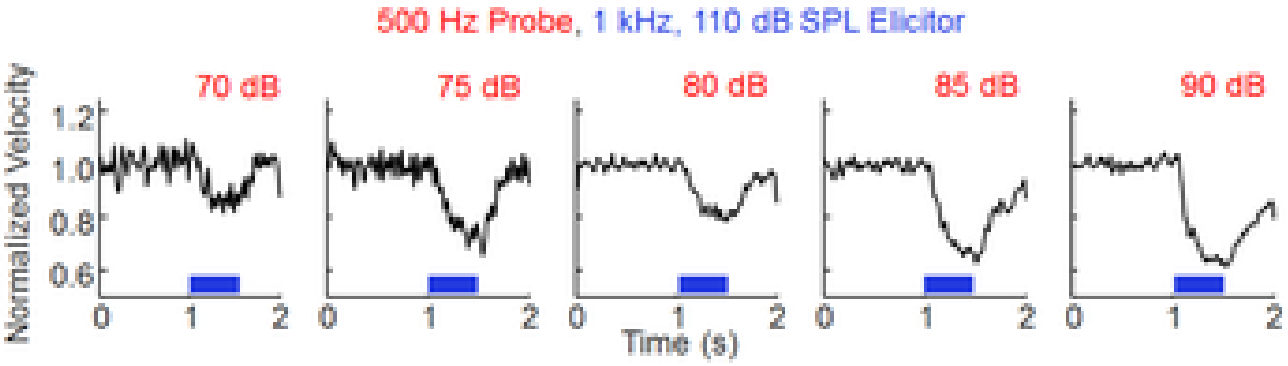
It mentions that muscle contraction produces noise... "Fast twitch fibers produce 30 to 70 contractions per second (equivalent to 30 to 70 Hz sound frequency)". Some people hear rumbling if they close their eyes really tight, etc.

The Tinnitus discussion is interesting. I turned 46 last year and just started to notice degradation in my hearing and Tinnitus around 10kHz particular at night. I could easily have tried to blame this on the excess noise produced during the day by my young daughter, or a symptom of too much caffeine intake in a futile attempt to be able to keep up with her! ;-)
...but sadly it probably has more to do with listening to music loud in my younger years. I've also listened to high-frequency sweeps at elevated volume from time to time searching for aliasing artefacts. Something which was foolish in hindsight and definitely more scientifically and safely quantifiable in a spectrogram anyway! Lesson learnt: Be kind to your ears.

-Richie,

And here is the important figure from the WIKI (not sourced there completely)



to compare with the ½ second response times suggested here:

http://electronotes.netfirms.com/ENWN46.pdf