alt.sci.physics.acoustics

Arau-Puchades reverberation formula

Desart Eric Ver perfil Más opciones 17 jul 2001, 13:38

Hi All

Below an interesting document, comparing lots of **reverberation** formulas/models etc.
http://www.sbu.ac.uk/~acogrp/ISVR97.html

What I'm looking for is the **Arau**-Puchades formula (also described in the
above link)

The best reference I find is:
H. **Arau**-Puchades, An improved **reverberation** formula, Acustica, 65, 163-180, 1988.
But I don't have this edition (I assume this is maybe the original introduction of the formula?).

Spent some time already on the net, and found lots of references to the
formula, but NOWHERE THE FORMULA ITSELF or details when and where to use
it.
Seems somehow related to the Fitzroy approach Angela spoke about.
Should like to know more about this.
Can anyone help?

Many thanks

Eric

alt.sci.physics.acoustics

Just an idea about absorption

Eric Desart Ver perfil Más opciones 3 ene 2002, 16:06

To ALL

This is may a stupid idea with limited chances.
I think most people busy with room acoustics are often confronted with the same
problem.

1) One has the measurement absorption data of different materials coming from
laboratories.
2) One does **Reverberation** measurements on site (e.g. industry) in order to
define the existing absorption, which then is translated in an existing A
(equivalent absorption).
3) One calculates the necessary A versus a target **reverberation** time.
4) One defines the difference between target A and existing A as being the to be
added A.
5) One divides the 'to be added A' by the Sabine values of the measurement
report, and one knows the number of m2 to be added in order to obtain the target
Reverberation Time.
6) The experienced acoustician knows that this calculation is not correct, and
will add a correction factor, which is mostly based on a trained instinct, own
database figures etc. etc..
Experience plays an extremely big roll here.

When one uses Sabine, Eyring, Millington, **Arau** Puchades, Fitzroy or still other
own improved or adjusted models, one is always confronted with the difference
between the Sabine values as measured in the laboratory, and the real alpha
values after being applied in real life circumstances.
Without knowing this for sure (I'm living in my own limited world). I think
that the Sabine approach is used the most, corrected by factors based on
experience, without having a real mathematical background (often given
scientific sounding names as diffusity, or efficiency factor and others).
If it should be possible to collect data from real life projects it should be
possible to find better mathematical or empirical relationships in function of
frequency, total A versus V/S and others.
I'm a bit familiar with working in laboratories, and have personally done lots
of measurements in Belgium, German and Netherlands official labs, and was
involved in many more.

I wonder, if the group can be an idea, to collect such data (even via
relationships with producers etc) in order to build a database, allowing

statistical analysis, and building some engineering curves, finding relationships etc.
Condition should be that the related projects are relative simple, in order to
exclude too much unknown influences and parameters, and that a good description
of the project is available. This includes technical description of the room,
good measurements before and after, clear lab data from the used material, how
it is used and so on.

If such data could become available, it must be possible to guarantee anonymity
where required, and availability of all data (anonymous if necessary) to all
parties contributing in any way. I'm almost certain Universities can be interested to be involved.

Is this idea just stupid, or can it have some potential?

Eric

Responder al autor Reenviar

Andre van der Merwe Ver perfil Más opciones 3 ene 2002, 17:39

I think it is a great idea -maybe post it on a central website, something we
all have.

Just one parameter i wish to add, that is the sound proofing characteristics
of the room enclosure ie the floor, walls and roof. We all know that 600mm
concrete let less sound escape than 16mm MDF, sure this will inflence the
absortion tests carried out on say 100mm thick fibreglass hardmounted on the
wall, specially in the lower frequencies.

your thoughts ?

regards

andre.

"Eric Desart" <af...@belgacom.net> wrote in message

news:3c347370$0$33516$ba620e4c@news.skynet.be...

- Mostrar texto de la cita -

Responder al autor Reenviar

Eric Desart Ver perfil Más opciones 3 ene 2002, 18:58

Hello Andre

I agree it should be done in a systematic way, meaning if such an idea should be
plausible, that someone, somehow should make a document, defining the necessary
parameters, allowing to do some valid subsequent study on this data.
Yours is certainly one since the absorption of your 100 mm fiberglass, can not
just be added to the absorption of your MDF or vice versa.

Just collecting data isn't enough. I really should see it as a basis for some
good statistical and mathematical investigation.

If you should get the allowance of companies as Rockwool Denmark, Ecomax,
Isover, Rockwool Netherlands and lots of others, don't speak about US yet, you
can fill such a site with hundreds if not thousands of measurements of their
basic materials. This has little sense

Furthermore there is the investment, and anonymity.
Information collected and measured over the years by companies, will be
rightfully protected (it are expensive company assets).
They rightfully will not just throw their expensively gathered know-how on the
street (as a matter of speech) for everybody to pick up.
Meaning that the final outcome should return useful information for them, to
compensate for the investment of cooperation, and guarantee that this can't harm
them directly or indirectly in any way (it's no fun to work for potential competition).
So maybe neutral institute's/organizations should be involved.

I'm not sure how to handle it, or even if this is a reasonable thought.
What I do believe is, that if enough quality information can be gathered, that
one finds somewhere an institute/organization/Univ. willing to study them.
This is information not easy to get by (in large enough quantity, with
systematical useful data, to do some good statistical/mathematical analysis).
I think huge manufactures of absorptive material, can have lots of project data,
which they provide (including measurements before/after) as a service for there
standard customers in the building walls/ceilings industry (in order to
sell/promote their own materials).

Eric

"Andre van der Merwe" <an...@acutec.net> schreef in bericht
news:iP%Y7.11126$pH1.108301@NewsReader...
| I think it is a great idea -maybe post it on a central website, something we
| all have.
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| your thoughts ?
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| regards
|
| andre.
|
| "Eric Desart" <af...@belgacom.net> wrote in message
| news:3c347370$0$33516$ba620e4c@news.skynet.be...
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| >
| > Eric
| >
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| >
|
|

Responder al autor Reenviar

Higini Arau Puchades Ver perfil Más opciones

Dear Eric,
I think that your idea is excellent but it will be difficult be carried, because it implies a lot of technical people participating. Moreover in the measurement field we could have a strong problem, because I remember a case exposed by R.W. Young JASA 31 (1959),p. 912,case exposed also in my theory of 1988, p.176 case 8, in where he had a rectangular concrete room of volume 1350 ft3, with sound absorbing material (area 265 ft2) covering the ceiling and top third of side walls, at 1000 cps the effective Sabine coefficient was 0.25; but when the material was arranged in a border 1 ft wide around the ceiling area, (area border 46 ft2), the effective Sabine coefficient of the absorptive material was 0.95. It implies that Sabine absorption coefficient is very dependent of the ubication of material in the room and also possibly of its geometry. I look, with Robert Willi Young, that the Sabine coefficient is not a true coefficient of absorption. I believe that absorption coefficient of a material would must be measured in a reverberant room covering all surfaces of the room with the testing material , applying the Eyring formula. As it probably is very expensive, I think that we would have realise this testing puting the material in three mutually perpendiculars surfaces , for example: floor, one side wall, and rear wall, obviously applying also the Eyring formula.
The problem is that testing Standards all are thought with Sabine formula. If we will use the Eyring formula in the sense expressed below then we will be able to measure the energetic coefficients of the absorption of the material, what is independent of its position in the room.
However, my dear Eric, I think that your idea is good to start with something that during many years is stoped, or better: never explored.
See you¡

- Mostrar texto de la cita -

Responder al autor Reenviar

Stephen Gosling >Is this idea just stupid, or can it 3 ene 2002, 20:41
Eric Desart Response interleaved "Stephen Goslin 3 ene 2002, 22:44

Eric Desart Ver perfil Más opciones 3 ene 2002, 22:44

Response interleaved (learned that from Richard).
First: I certainly don't have all the answers, just searching if it could have
sense, and if then how.

"Higini **Arau** Puchades" <h.a...@terra.es> schreef in bericht
news:beec2401.0201031052.62d28c79@posting.google.com...
| Dear Eric,
| I think that your idea is excellent but it will be difficult be
| carried, because it implies a lot of technical people participating.

I understand, and the distance is unpractical, but maybe one can start with a
protected site only accessible for the (whoever) people involved. And just one
or few, collect data, and is responsible for uniformity and systematic in the
data.
Think the net when properly used can assist a lot.

| Moreover in the measurement field we could have a strong problem,
| because I remember a case exposed by R.W. Young JASA 31
(1959),.......shortened.............0.95. It implies that Sabine
| absorption coefficient is very dependent of the ubication of material
| in the room and also possibly of its geometry. I look, with Robert
| Willi Young, that the Sabine coefficient is not a true coefficient of
| absorption.

I know, and it's not possible to grasp all influencing parameters, therefor one
should only use project which can clearly be described.
But even the phenomena you describe, if enough data is available, can be (in a
certain degree) described and evaluated.

I once went in the **reverberation** room with 12 baffles, which I measured in any
way I could think of: Flat on the ground, vertical as baffels, with and without
surrounding frame, with and without surrounding frame in the empty room (as
reference), spread them over the floor surface, put them in corners, with and
without centre core in the baffles, in the edges of the room and so on, and so
on.
I put all curves on top of one another in one graph. Anytime a customer started
bean counting when comparing materials of different suppliers in view of alpha
S, I showed him the graph, asking which curve he did like best. He never could
believe that those were based on the same material measured in the same lab.
And indeed also some of my coleagues couldn't.
As a result of this test session the KULeuven (university) added additional
parameters in their ray-tracing model.

I believe that absorption coefficient ...., applying the Eyring formula. As it
............| The problem is that testing Standards all are thought with Sabine
| formula.

I agree that maybe other methods are or can be called for, but fact of the
matter is that for now all standards, world-wide are based on the same principle. I heard different suggestions already in relation to that, but that's for more clever guys than I am (to intrusive).

| However, my dear Eric, I think that your idea is good to start with
| something that during many years is stoped, or better: never explored.

I do thank you for the support, even when it's just wishful thinking

Kind regards

Responder al autor Reenviar

Brian Marston > I think it is a great idea -maybe pc 3 ene 2002, 23:40
Eric Desart Hello Brian, This is a bit a different sub 4 ene 2002, 01:21
Kari Pesonen Ver perfil Más opciones 4 ene 2002, 08:30

Eric,
Interesting idea and worth studying, but
- we know that **reverberation** time does not depend unequivocally on quantity and acoustical quality of absorption material and materials in room,
- this is why measuring methods that are based on measured **reverberation** time(s) do not give absorption coefficients that were unequivocal metrics of material quantity and quality or globally valid, but coefficients that are merely case by case, and also microphone and sound source position/characteristics, depended variables. We have to ask: what other variables we should use to normalize the data or/and to include in the data base to guarantee usability of data.
- one issue producing problems is the fact that in practice total room absorption (that one influencing **reverberation** time) consists of several different materials and other details/variables. How to extract the effects of separate materials?

besr regards

Kari Pesonen

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E-mail: Kari.Peso...@hut.fi

- Mostrar texto de la cita -

Responder al autor Reenviar

Eric Desart "Kari Pesonen" <Kari.Pesonen@no_sp 4 ene 2002, 13:22
Eric Desart Hello Kari Sorry part of a sentence rem 4 ene 2002, 14:16
Angelo Campanella Ver perfil Más opciones 4 ene 2002, 18:12

Eric Desart wrote:
> This e factor then is substituted by an empirical defined factor.
> That's also why more data should be useful to have better statistics.

To give you an idea of the vagaries involved in this whole sound absorption lab/field/design/result conundrum, note the instructions

proffered to commission a laboratory test **reverberation** room (viz. ASTM
C423-99a):
(A sound absorber specimen totaling 72 square feet is assembled on the
test room floor. It is known that the sound field in the test room
initially is NOT diffuse.)
Then diffuser panels, typically 3/4" plywood, are mounted at random
positions and orientations in the **reverberation** room in a feverish
attempt at destroying as many standing wave patterns as possible. The
following is the (1999 version) cook-book instructions on how to make a
test room diffuse:

"X1.2.2.2 Sound absorption measurements are made on the test specimen
with no diffusers, with a small number of diffusers (approximately 5
square meters), and as the quantity of diffusers is increased in 5 Sq.m
steps.

"X1.2.2.3 For each set of measurements the mean value of the sound
absorption coefficients, in the range 500 to 4000 Hz, is calculated and
these values are plotted against the total area or number of diffusers
used in each case.

"X1.2.2.4 It will be found that the mean sound absorption coefficient
approaches a maximum and thereafter remains constant or decreases with
increasing numbers of diffusers. The optimum total area or number of
diffusers is chosen as that which first achieves the maximum value.

NOTE X1.1- From experience, it has been found in rectangular rooms the
area (both sides) of diffusers required to achieve satisfactory
diffusion is 15% to 25% of the total surface area of the room."

It is clear (to me, anyway) that:

1- This is a treasure hunt for producing the greatest absorption values
possible in a "credible" fashion.

2- Results below 500 Hz will not be for a diffuse field.

3- Practical rooms we live, play and work in hardly ever get this degree
of diffusion except by accident (viz., storage room, room under
construction, etc.)

4- Results are precise only for a 9'x8' sound absorber panel laid on the
floor of a large room!!!!!!!!!

In our individual and respectful ways, we each have to transfer these
ideal diffuse 9x8-on-the-floor coefficients to practical, different
sized rooms with different treatment areas and location configurations.

Lots of luck!

Angelo Campanella

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--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to
hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor Reenviar

Eric Desart "Angelo Campanella" <a.campane...@ 5 ene 2002, 02:31

Angelo Campanella Ver perfil Más opciones 5 ene 2002, 06:51

Eric Desart wrote:
> What about the simple Sabine example? Why just selecting this sentence?
> For me it's about the principle (in this case just extended to a better Eyring
> approach).

The laboratory ,method uses the simple Sabine formula for it s computation. The room is operated empty, giving the room's inherent absorption in sabines (US) or square meters (ISO). Then the specimen is
carried in and put in it's empirically favored position, then the room is operated again, producing a new and larger absorption "area". The difference in "area" is then divided by the physical (fascia) area reported as the random incidence sound absorption coefficient.

Several years ago, I calculated the entire process using the Eyring (A
substituted with -S*lg(1-alpha)), where S is the entire room surface area and alpha is the AVERAGE absorption coefficient over that entire area, S. This indeed made a difference, but it was very slight, perhaps 0.01 for an absorption coefficient of nearly 1.0. The twist of fate is that the alpha in the formula is not that of the specimen, but that of all S. In that way, the Eyring effect is never seen in **reverberation** room tests. But we certainly encounter the divergence of Eyring absorption from sabine absorption in practical habitable rooms. Again, the Eyring effect is a mathematical fact, not a physical phenomenon. Our
quest remains to find an adequate simulation of reality. The reason why
"absorption coefficients" greater than 1.0 are "measured and reported remains to be discussed another day, as it is even more perplexing.

> The most common used calculation method simply ignores the interactive effect
> with the existing absorption in the room. Never understood why. An extremely
> simple formula can already improve on that (see example).

I think I have explained how this "interaction" is handled in laboratory methodology and calculation.

> I don't think (to me) it's a hunt for the greatest absorption value, but trying
> to assure equality between different laboratories, which can be obtained by
> optimizing the diffuse field, rather then hoping that modal problems between
> laboratories will be similar and return the same absorption results.

OK, I was trying to be humorous. You are right in that one can hope for
unification via maximized diffusion. Don't we all await the day when frequencies lower that 500 Hz are included. But, I ask, can we argue that the status quo is proper???

> The Sabine approach is known and accepted as being valid for highly diffuse
> fields (only then it will ca equal the Eyring approach).
> The lab Sabine values have shown to be a valid input for ray-tracing models (as
> per studies in KULeuven I know about).

> Knowing this, how to use those values in real-live circumstances.
 That's indeed
> a question.

Some modeling includes a choice of diffusion, which has the potential of
improving agreement between modeling and reality.

> straightforward projects) and mathematical approximations. For me this seems as
> a logical empirical approach: collecting data, finding common patterns,
> investigating and describing. Trying does not guarantees optimum results. Not
> trying guarantees certainly NO result at all. The newsgroup (established by
> yourself, for which my respect) as I read, was also meant to bring the acoustic
> community together. I don't know of a better way to reach so many.

If we could ever codify the measurement, the cataloging and the model
application of sound absorption coefficients (normal incidence as well as random), it would indeed be a feather in our caps!

> If not one should accept that roomacoustics is only meant for people with very
> many years of experience, since no mathematical approach seems to allow any
> reasonable approximation.

The shoemaker has his favorite last and patterns; acousticians have their
favorite algorithms for room reverberance calculation. It's a happy world out there!

Cheers,

Ang. C.

--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor Reenviar

Higini Arau Puchades Ver perfil Más opciones 5 ene 2002, 18:33

- Mostrar texto de la cita -

Dear Angelo,

I am very intriguedwith exposed by you in this paragraph, and now I have great desire to know your experiencies about this subject. In the meantime I have searched in the Jour. Acoust.Soc.Am trying to meet a
paper of you in where were indicated the Eyring effect, however my chance have been bad. I would like me obtain more information to understand best your knowledgment.
However, I look, there is a physical law that never can be violated: The principle of energy conservation. And the Sabine coefficient absorption can violate when it is higher the unity.
I give a example, to see case 100 of J.R.Bistafa-J.S.Bradley, JASA 108(4) October,in this case we have a room of 9.20 m x 4.67 m x 3.56 m, the volume is 184.754 m3, the entire area walls is 152.952 m2.

The **reverberation** times empty room, in 500 Hz, are:
RT measured = 5.234 s
RT Sabine = 5.297 s
RT Eyring = 5.234 s
RT **Arau** = 5.234 s
m(air)= 0.0002
The surfaces of the room according Eyring have an alfa= 0.0245.
The absorption material has a alfa = 0.98 (500 Hz), measured by authors by ASTM procedure.
Placed the absorption materiak in ceiling, with area 42.269 m2,the authors measured and calculated for 500 Hz:
RT measured = 1.20 s
RT Sabine = 0.568 s
RT Eyring = 0.499
RT **Arau** = 1.177 s.
Now if we accept the RT measured as good I ask me what would be the
alfa Sabine of material, I answer it:
The mean coefficient of the room would be: alfa average = 0.13494/1.2
= 0.1124,
being 0.163V/S = 0.13494.
If now we calculate of absorption clearing (alfa mat) from:
42.269 alfa mat + 3.49085 = 184.754 x 0.11245
is obtained that Alfa mat = 0.4089.
Value well different to the obtained in ASTM test by authors.
Dear Angelo is possible that you explain your effect Eyring using this example?

Keeping with interest, your friend. Very regards. Higini

Responder al autor Reenviar

Angelo Campanella Ver perfil Más opciones 6 ene 2002, 03:24

- Mostrar texto de la cita -

Eyring (JASA, Jan. 1930, pp217-241) and others have observed that the
reverberation phenoenon, when involving highly absorbing rooms can
"better" be represented by -S*lg(1-alpha) than S*alpha.

> However, I look, there is a physical law that never can be violated:
> The principle of energy conservation. And the Sabine coefficient
> absorption can violate when it is higher the unity.

Clearly, the Eyring approximation will introduce the possibility that larger values of the Sabine approximation (don't all shoot at me at once!) can be greater than unity when the Eyring "alpha" value is not. But finally we must all realize that the "unity" we reference is not being applied to a physical reality, but merely a numeral generated according to a Standard measurement method. This "random incidence
absorption coefficient" was held out to us by Sabine himself as the ratio of the "sound absorbing power" of a specimen to its projected area. The fact that some device can absorb sound to a greater extent that is implied by its projecred area should not come as a surprise. Sabine's "power" is not the physical caories per second entity, but rather an an entity which I don't think he really defined much further, though indeed he, and others, certainly tried to do so on many occasions.

> I give a example, to see case 100 of J.R.Bistafa-J.S.Bradley, JASA
> 108(4) October,in this case we have a room of 9.20 m x 4.67 m x 3.56
> m, the volume is 184.754 m3, the entire area walls is 152.952 m2.
> The **reverberation** times empty room, in 500 Hz, are:

> RT measured = 5.234 s

To this point, you provide a rational picture

> RT Sabine = 5.297 s
> RT Eyring = 5.234 s
> RT **Arau** = 5.234 s

But how did you "calculate" the room RT? Did you use the wall areas and
previously "known" absorption coeficients for all room surfaces?

- Mostrar texto de la cita -

Since all the material was located in one plane, the remaining sound
field is NOT diffuse, so neither Eyring, nor Sabine formulas are applicable. The closest approximation is that by Fitzroy (JASA, July, 1959, p 893), who treated each of the three directions separately. There, you will find an Alpha result closer to your measurement. See also "Acoustics" by Michael Rettinger, p 118 where he lists a trilogy of results like the case you describe. The simple explanation is that parallel surfaces without any absorption trap sound waves for a time far beyond that expected from absorption area placed on the other walls
in that room (my words). Fitzroy modeled that case.

> Dear Angelo is possible that you explain your effect Eyring using this
> example?

I can only say that you now have a good grasp of the conundrum we
acoustical consultants face daily!

Angelo Campanella

--
--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor Reenviar

Angelo Campanella OOOPS! wrong Rettinger pag 6 ene 2002, 03:41

Higini Arau Puchades Ver perfil Más opciones

Angelo Campanella <a.campane...@worldnet.att.net> wrote in message
<news:3C37B95F.3050004@worldnet.att.net>...
> OOOPS! wrong Rettinger page:

> Angelo Campanella wrote:

> > There, you will find an Alpha result closer to your measurement. See
> > also "Acoustics" by Michael Rettinger, p 118 where he lists a trilogy of

> > results like the case you describe. The simple explanation is that

> Make that Page 87 in his 1969 edition and then Page 27 in his second
> edition "Acoustical Design and Noise Control", Vol. 1., 1977.

> Angelo Campanella

Dear Angelo Campanella,

I Know well all papers written by Fitzroy because his thought was the starting point and inspiration of my theory (1988).
The other day in my email group I forgot to write the RT Fitzroy for 500 Hz, the result calculated is: RT Fitroy = 2.925s while the measured by Bistafa- Bradley experiment,(year 2000), JASA 108(4)October, is RT measured = 1.20 s.
Therefore we have almoast 2.5 times RT Fitzroy greatest than RT experimental measured.
I wish clarify that when you say are my measurements it are measurements of Bistafa-Bradley and not mine.

I believe that problem posed in the begining by Eric Desart is difficult, that the truth is hidden behind a very thick cloud and therefore is very difficult to see it. Perhaps we have a good chance that it be so because through of it we can discuss with frienship trying discover something more.

Sincerely yours

Higini **Arau**

Responder al autor Reenviar

Eric Desart Hello Higini, | Now if we accept the RT 6 ene 2002, 14:10
Eric Desart "Angelo Campanella" <a.campane...@ 6 ene 2002, 14:25
Higini Arau Puchades "Eric Desart" <af...@belgac 6 ene 2002, 21:40
Eric Desart Ver perfil Más opciones 6 ene 2002, 23:09

Hi Higini

First, thanks for your explanation.
Second, Sorry, I was wrong, I knew your paper was published in Acustica.

What kind of help?
I'm certainly not Shakespeare, my English is bad, and to be honest, yours isn't
much better. I also don't speak Spanish.

But I really should be honored, if I could assist in any way, within my many
limitations.
And I can not imagine that I should be alone.
So I don't know how to translate this in practical terms, but a solution should
and can be found.

I feel a bit helpless now, not knowing what to say, just that I'm impressed.
And hope that somehow a practical solution exists

My warm regards

Eric

"Higini **Arau** Puchades" <h.a...@terra.es> schreef in bericht
news:beec2401.0201061240.16700716@posting.google.com...
| "Eric Desart" <af...@belgacom.net> wrote in message
<news:3c384894$0$75155$ba620e4c@news.skynet.be>...
| > Hello Higini,
| >
| > | Now if we accept the RT measured as good I ask me what would be the
| > | alfa Sabine of material, I answer it:

| > | The mean coefficient of the room would be: alfa average =
0.13494/1.2
| > | = 0.1124,
| > | being 0.163V/S = 0.13494.
| > | If now we calculate of absorption clearing (alfa mat) from:
| > | 42.269 alfa mat + 3.49085 = 184.754 x 0.11245
| > | is obtained that Alfa mat = 0.4089.
| >
| > Can you please go in a bit deeper on your calculations?
| > What is this mean coefficient? 0.1124 (I see the formula + V/S +
RT60)
| > What is this 3.49085 (air?)?
|
| Dear Eric,
| I clarify a little my numbers.
| The averaged absorption coefficient of the room, assuming the RT
| experimental value determinated by Bistafa-Bradley,applying Sabine
| formula, would be :
| alfa averaged room = 0.163V /S RT = (0.163V/S)/RT
|
| alfa averaged room = 0.13494/1.2 = 0.1124,
| being 0.163V/S = 0.13494 and RTexperimental = 1.2
|
| If now we calculate the absorption of the ceiling: alfa mat, clearing
| up(alfa mat)from average mean value derived, we have:
|
| Surface ceiling x alfa mat+ Sum of area of remainder surfaces x alfa
| remainder = Area total of surfaces x mean absorption coefficient
room.
|
| 42.269 x alfa mat+ (0.695 + 65.504+ 33.2504)x 0.0245 = 184.754 x
| 0.1124
|
| 42.269 alfa mat + 3.49085 = 184.754 x 0.11245
|
| Clearing up alfa mat from this equation we obtain: alfa mat = 0.4089
=
| 0.41.
| (In reality the air absorption for this frequency is almoast
| negligible.)
|
| It implies that taking as good the RTexperimental below cited, and
| calculating with Sabine formula we would obtain an alfa mat well
| different to the measured by ASTM Standard in a Reverberant room.
This
| implies that the non diffuse
| soundfield introduces a decreasing of the absorption in the absorbent
| material.
| >
| > Since not everybody has easy access to old JASA papers, and
neither
Fitzroy,
| > nor your approach is integrated in lots of textbooks, to make
somehow a
paper,
| > explaining the approaches more in-depth, easier accessible?
| > This then could be made available on a website, wherever? I
understand this
can
| > be a lot of work, so yesterday is soon enough (sorry, stupid joke).
| > Since your Formula is basically based on an improved/extended
Fitzroy
approach,
| > I can't think of a better person to do so.
| >
| > Does your JASA paper exists in a form or document that can be put
on a
website?
| > (Not .pdf = bad readable if coming from a scanned document).
|
| Dear Eric, nor the paper of Fitzroy neither my paper, the first
| belonging to JASA and the other t Hirzel-Verlag, can be published

| without permission o editorial, and I do not know if is possible to
| obtain this permission.
| By I another hand I would be able and very honoured to prepare a text
| exposing both formula, theories and concepts, begining in my
| exposition with the thougth of Bagenal(1941) who was the pionner in
| this idea although he expressed it only verbally.
| I am a memeber associated, in possesion of my silver certificate, of
| the Acoustical Society of America. Ever I had wished be member
| honorary of this Society, but for it is required to show enough
| experience that never I get. Well, I remember when I went to Sabine
| Centennial (1995), I said me or I go now or never will go. I had need
| to go Boston to see the spaces in where Sabine run. The emotion was
| very great for me because I knew the Harvard University and MIT
| Institute, and knew those parks very calm, where I stayed thinking
| more theories that after I wrote. I believe that writing, that you
| proupose, about Fitzroy and mine theory I could get both things, to be
| member and also repeat the same and wonderfull sensations that I
| obtained in Boston.
| But for it I need a strong help because I am not Sheakspeare nor I do
| not know put websites having elaborated a document in PDF.
|
| Kind regards.
|
| Higini

Responder al autor Reenviar

Eric Desart "Eric Desart" <af...@belgacom.net> sc 7 ene 2002, 01:47

Angelo Campanella Ver perfil Más opciones 7 ene 2002, 02:31

Higini **Arau** Puchades wrote:
> I believe that problem posed in the begining by Eric Desart is
> difficult, that the truth is hidden behind a very thick cloud and
> therefore is very difficult to see it. Perhaps we have a good chance
> that it be so because through of it we can discuss with frienship
> trying discover something more.

Yes, we should do that.

I note further that in addition to the Eyring and Fitzroy adjustments for room geometry, Tom North wood investigated the effect of diffraction
due to the edge and the size of the absorber panels. His was able to formulate and publish that realtionship in JASA (Northwood, Grisau and
Medcof, JASA (31) 1959, pp 595-599. Later, he codified his modeling result in JASA (35). 1963, p 1174. In the latter, the relationship between panel size, wavelength acoustcal impedance and sound absorption
was implemented into a graph.
I have extended that work by drawing a graph of alpha vs frequency, size
input parametric, impedance input indicated, using Northwood's algorithms. Attempts at publishing this refinement has largely failed because of the editorial requirements of JASA. But I maintain it for my frequent personal use. It easliy represents and quantifies the "absorption greater than unity" values of normal specimens. Northwood's
algoritm, derived from modeling an absorber as a narrow but infinitely long absorber, implies that this excess over unity has an asymptotic value of 8 for very tiny patches of absorber material. (That is, if one cuts an absorber into many tiny patches, the sound absorbing power of
that arrangement could hypothetically be eight times that which occurred
when that same material was a single large panel. The effect is very frequency dependednt, with the highest frequencies experiencing the

least, if any, increase). We will not achieve nearly that increase in practice. But it does make one want to advise architests to spread small
patches of sound absorbers all around a room rather than on a single wall or the ceiling.

Angelo Campanella.

--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to hold a reserve that would carry me through." - Charles A. Lindbergh.

alt.sci.physics.acoustics

Just an idea about absorption

Eric Desart Ver perfil Más opciones 3 ene 2002, 16:06

To ALL

This is may a stupid idea with limited chances.
I think most people busy with room acoustics are often confronted with the same
problem.

1) One has the measurement absorption data of different materials coming from
laboratories.
2) One does **Reverberation** measurements on site (e.g. industry) in order to
define the existing absorption, which then is translated in an existing A (equivalent absorption).
3) One calculates the necessary A versus a target **reverberation** time.
4) One defines the difference between target A and existing A as being the to be
added A.
5) One divides the 'to be added A' by the Sabine values of the measurement
report, and one knows the number of m2 to be added in order to obtain the target
Reverberation Time.
6) The experienced acoustician knows that this calculation is not correct, and
will add a correction factor, which is mostly based on a trained instinct, own
database figures etc. etc..
Experience plays an extremely big roll here.

When one uses Sabine, Eyring, Millington, **Arau** Puchades, Fitzroy or still other
own improved or adjusted models, one is always confronted with the difference
between the Sabine values as measured in the laboratory, and the real alpha
values after being applied in real life circumstances.
Without knowing this for sure (I'm living in my own limited world). I think
that the Sabine approach is used the most, corrected by factors based on
experience, without having a real mathematical background (often given
scientific sounding names as diffusity, or efficiency factor and others).
If it should be possible to collect data from real life projects it should be
possible to find better mathematical or empirical relationships in function of
frequency, total A versus V/S and others.
I'm a bit familiar with working in laboratories, and have personally done lots
of measurements in Belgium, German and Netherlands official labs, and was
involved in many more.

I wonder, if the group can be an idea, to collect such data (even via
relationships with producers etc) in order to build a database, allowing

statistical analysis, and building some engineering curves, finding relationships etc.
Condition should be that the related projects are relative simple, in order to
exclude too much unknown influences and parameters, and that a good description
of the project is available. This includes technical description of the room,
good measurements before and after, clear lab data from the used material, how
it is used and so on.

If such data could become available, it must be possible to guarantee anonymity
where required, and availability of all data (anonymous if necessary) to all
parties contributing in any way. I'm almost certain Universities can be interested to be involved.

Is this idea just stupid, or can it have some potential?

Eric

Responder al autor Reenviar

Andre van der Merwe Ver perfil Más opciones 3 ene 2002, 17:39

I think it is a great idea -maybe post it on a central website, something we
all have.

Just one parameter i wish to add, that is the sound proofing characteristics
of the room enclosure ie the floor, walls and roof. We all know that 600mm
concrete let less sound escape than 16mm MDF, sure this will inflence the
absortion tests carried out on say 100mm thick fibreglass hardmounted on the
wall, specially in the lower frequencies.

your thoughts ?

regards

andre.

"Eric Desart" <af...@belgacom.net> wrote in message

news:3c347370$0$33516$ba620e4c@news.skynet.be...

- Mostrar texto de la cita -

Responder al autor Reenviar

Eric Desart Ver perfil Más opciones 3 ene 2002, 18:58

Hello Andre

I agree it should be done in a systematic way, meaning if such an idea should be
plausible, that someone, somehow should make a document, defining the necessary
parameters, allowing to do some valid subsequent study on this data.
Yours is certainly one since the absorption of your 100 mm fiberglass, can not
just be added to the absorption of your MDF or vice versa.

Just collecting data isn't enough. I really should see it as a basis for some
good statistical and mathematical investigation.

If you should get the allowance of companies as Rockwool Denmark, Ecomax,
Isover, Rockwool Netherlands and lots of others, don't speak about US yet, you
can fill such a site with hundreds if not thousands of measurements of their
basic materials. This has little sense

Furthermore there is the investment, and anonymity.
Information collected and measured over the years by companies, will be
rightfully protected (it are expensive company assets).
They rightfully will not just throw their expensively gathered know-how on the
street (as a matter of speech) for everybody to pick up.
Meaning that the final outcome should return useful information for them, to
compensate for the investment of cooperation, and guarantee that this can't harm
them directly or indirectly in any way (it's no fun to work for potential competition).
So maybe neutral institute's/organizations should be involved.

I'm not sure how to handle it, or even if this is a reasonable thought.
What I do believe is, that if enough quality information can be gathered, that
one finds somewhere an institute/organization/Univ. willing to study them.
This is information not easy to get by (in large enough quantity, with systematical useful data, to do some good statistical/mathematical analysis).
I think huge manufactures of absorptive material, can have lots of project data,
which they provide (including measurements before/after) as a service for there
standard customers in the building walls/ceilings industry (in order to sell/promote their own materials).

Eric

"Andre van der Merwe" <an...@acutec.net> schreef in bericht
news:iP%Y7.11126$pH1.108301@NewsReader...
| I think it is a great idea -maybe post it on a central website, something we
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| regards
|
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|
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| news:3c347370$0$33516$ba620e4c@news.skynet.be...
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| target
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| > Experience plays an extremely big roll here.
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| >
| > Is this idea just stupid, or can it have some potential?
| >
| > Eric
| >
| >
| >
|
|

Responder al autor   Reenviar

Higini Arau Puchades Ver perfil   Más opciones

Dear Eric,
I think that your idea is excellent but it will be difficult be
carried, because it implies a lot of technical people participating.
Moreover in the measurement field we could have a strong problem,
because I remember a case exposed by R.W. Young JASA 31 (1959),p.
912,case exposed also in my theory of 1988, p.176 case 8, in where he
had a rectangular concrete room of volume 1350 ft3, with sound
absorbing material (area 265 ft2) covering the ceiling and top third
of side walls, at 1000 cps the effective Sabine coefficient was 0.25;
but when the material was arranged in a border 1 ft wide around the
ceiling area, (area border 46 ft2), the effective Sabine coefficient
of the absorptive material was 0.95. It implies that Sabine
absorption coefficient is very dependent of the ubication of material
in the room and also possibly of its geometry. I look, with Robert
Willi Young, that the Sabine coefficient is not a true coefficient of
absorption. I believe that absorption coefficient of a material would
must be measured in a reverberant room covering all surfaces of the
room with the testing material , applying the Eyring formula. As it
probably is very expensive, I think that we would have realise this
testing puting the material in three mutually perpendiculars surfaces
, for example: floor, one side wall, and rear wall, obviously applying
also the Eyring formula.
The problem is that testing Standards all are thought with Sabine
formula. If we will use the Eyring formula in the sense expressed
below then we will be able to measure the energetic coefficients of
the absorption of the material, what is independent of its position
in the room.
However, my dear Eric, I think that your idea is good to start with
something that during many years is stoped, or better: never explored.
See you¡

- Mostrar texto de la cita -

Responder al autor   Reenviar

Stephen Gosling >Is this idea just stupid, or can it 3 ene 2002, 20:41
Eric Desart Response interleaved "Stephen Goslin 3 ene 2002, 22:44

Eric Desart Ver perfil Más opciones 3 ene 2002, 22:44

Response interleaved (learned that from Richard).
First: I certainly don't have all the answers, just searching if it could have
sense, and if then how.

"Higini **Arau** Puchades" <h.a...@terra.es> schreef in bericht
news:beec2401.0201031052.62d28c79@posting.google.com...
| Dear Eric,
| I think that your idea is excellent but it will be difficult be
| carried, because it implies a lot of technical people participating.

I understand, and the distance is unpractical, but maybe one can start with a
protected site only accessible for the (whoever) people involved. And just one
or few, collect data, and is responsible for uniformity and systematic in the
data.
Think the net when properly used can assist a lot.

| Moreover in the measurement field we could have a strong problem,
| because I remember a case exposed by R.W. Young JASA 31
(1959),.......shortened.............0.95. It implies that Sabine
| absorption coefficient is very dependent of the ubication of material
| in the room and also possibly of its geometry. I look, with Robert
| Willi Young, that the Sabine coefficient is not a true coefficient of
| absorption.

I know, and it's not possible to grasp all influencing parameters, therefor one
should only use project which can clearly be described.
But even the phenomena you describe, if enough data is available, can be (in a
certain degree) described and evaluated.

I once went in the **reverberation** room with 12 baffles, which I measured in any
way I could think of: Flat on the ground, vertical as baffels, with and without
surrounding frame, with and without surrounding frame in the empty room (as
reference), spread them over the floor surface, put them in corners, with and
without centre core in the baffles, in the edges of the room and so on, and so
on.
I put all curves on top of one another in one graph. Anytime a customer started
bean counting when comparing materials of different suppliers in view of alpha
S, I showed him the graph, asking which curve he did like best. He never could
believe that those were based on the same material measured in the same lab.
And indeed also some of my coleagues couldn't.
As a result of this test session the KULeuven (university) added additional
parameters in their ray-tracing model.

I believe that absorption coefficient ...., applying the Eyring formula. As it
............| The problem is that testing Standards all are thought with Sabine
| formula.

I agree that maybe other methods are or can be called for, but fact of the
matter is that for now all standards, world-wide are based on the same principle. I heard different suggestions already in relation to that, but that's for more clever guys than I am (to intrusive).

| However, my dear Eric, I think that your idea is good to start with
| something that during many years is stoped, or better: never explored.

I do thank you for the support, even when it's just wishful thinking

Kind regards

Responder al autor Reenviar

Brian Marston > I think it is a great idea -maybe pc 3 ene 2002, 23:40

Eric Desart Hello Brian, This is a bit a different sub 4 ene 2002, 01:21

Kari Pesonen Ver perfil Más opciones 4 ene 2002, 08:30

Eric,
Interesting idea and worth studying, but
- we know that **reverberation** time does not depend unequivocally on
quantity and acoustical quality of absorption material and materials in room,
- this is why measuring methods that are based on measured **reverberation**
time(s) do not give absorption coefficients that were unequivocal metrics
of material quantity and quality or globally valid, but coefficients that are merely
case by case, and also microphone and sound source position/characteristics,
depended variables. We have to ask: what other variables we should
use to normalize the data or/and to include in the data base to guarantee
usability of data.
- one issue producing problems is the fact that in practice total room absorption
(that one influencing **reverberation** time) consists of several different materials
and other details/variables. How to extract the effects of separate materials?

besr regards

Kari Pesonen

--
E-mail: Kari.Peso...@hut.fi

- Mostrar texto de la cita -

Responder al autor Reenviar

Eric Desart "Kari Pesonen" <Kari.Pesonen@no_sp 4 ene 2002, 13:22

Eric Desart Hello Kari Sorry part of a sentence rem 4 ene 2002, 14:16

Angelo Campanella Ver perfil Más opciones 4 ene 2002, 18:12

Eric Desart wrote:
> This e factor then is substituted by an empirical defined factor.
> That's also why more data should be useful to have better statistics.

To give you an idea of the vagaries involved in this whole sound absorption lab/field/design/result conundrum, note the instructions

proffered to commission a laboratory test **reverberation** room (viz. ASTM
C423-99a):
(A sound absorber specimen totaling 72 square feet is assembled on the
test room floor. It is known that the sound field in the test room
initially is NOT diffuse.)
Then diffuser panels, typically 3/4" plywood, are mounted at random
positions and orientations in the **reverberation** room in a feverish
attempt at destroying as many standing wave patterns as possible. The
following is the (1999 version) cook-book instructions on how to make a
test room diffuse:

"X1.2.2.2 Sound absorption measurements are made on the test specimen
with no diffusers, with a small number of diffusers (approximately 5
square meters), and as the quantity of diffusers is increased in 5 Sq.m
steps.

"X1.2.2.3 For each set of measurements the mean value of the sound
absorption coefficients, in the range 500 to 4000 Hz, is calculated and
these values are plotted against the total area or number of diffusers
used in each case.

"X1.2.2.4 It will be found that the mean sound absorption coefficient
approaches a maximum and thereafter remains constant or decreases with
increasing numbers of diffusers. The optimum total area or number of
diffusers is chosen as that which first achieves the maximum value.

NOTE X1.1- From experience, it has been found in rectangular rooms the
area (both sides) of diffusers required to achieve satisfactory
diffusion is 15% to 25% of the total surface area of the room."

It is clear (to me, anyway) that:

1- This is a treasure hunt for producing the greatest absorption values
possible in a "credible" fashion.

2- Results below 500 Hz will not be for a diffuse field.

3- Practical rooms we live, play and work in hardly ever get this degree
of diffusion except by accident (viz., storage room, room under
construction, etc.)

4- Results are precise only for a 9'x8' sound absorber panel laid on the
floor of a large room!!!!!!!!!

In our individual and respectful ways, we each have to transfer these
ideal diffuse 9x8-on-the-floor coefficients to practical, different
sized rooms with different treatment areas and location configurations.

Lots of luck!

Angelo Campanella

--
--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to
hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor Reenviar

Eric Desart "Angelo Campanella" <a.campane...@ 5 ene 2002, 02:31

Angelo Campanella Ver perfil Más opciones 5 ene 2002, 06:51

Eric Desart wrote:
> What about the simple Sabine example? Why just selecting this sentence?
> For me it's about the principle (in this case just extended to a better Eyring
> approach).

The laboratory ,method uses the simple Sabine formula for it s computation. The room is operated empty, giving the room's inherent absorption in sabines (US) or square meters (ISO). Then the specimen is
carried in and put in it's empirically favored position, then the room is operated again, producing a new and larger absorption "area". The difference in "area" is then divided by the physical (fascia) area reported as the random incidence sound absorption coefficient.

Several years ago, I calculated the entire process using the Eyring (A
substituted with -S*lg(1-alpha)), where S is the entire room surface area and alpha is the AVERAGE absorption coefficient over that entire area, S. This indeed made a difference, but it was very slight, perhaps 0.01 for an absorption coefficient of nearly 1.0. The twist of fate is that the alpha in the formula is not that of the specimen, but that of all S. In that way, the Eyring effect is never seen in **reverberation** room tests. But we certainly encounter the divergence of Eyring absorption from sabine absorption in practical habitable rooms. Again, the Eyring effect is a mathematical fact, not a physical phenomenon. Our
quest remains to find an adequate simulation of reality. The reason why
"absorption coefficients" greater than 1.0 are "measured and reported remains to be discussed another day, as it is even more perplexing.

> The most common used calculation method simply ignores the interactive effect
> with the existing absorption in the room. Never understood why. An extremely
> simple formula can already improve on that (see example).

I think I have explained how this "interaction" is handled in laboratory methodology and calculation.

> I don't think (to me) it's a hunt for the greatest absorption value, but trying
> to assure equality between different laboratories, which can be obtained by
> optimizing the diffuse field, rather then hoping that modal problems between
> laboratories will be similar and return the same absorption results.

OK, I was trying to be humorous. You are right in that one can hope for
unification via maximized diffusion. Don't we all await the day when frequencies lower that 500 Hz are included. But, I ask, can we argue that the status quo is proper???

> The Sabine approach is known and accepted as being valid for highly diffuse
> fields (only then it will ca equal the Eyring approach).
> The lab Sabine values have shown to be a valid input for ray-tracing models (as
> per studies in KULeuven I know about).

> Knowing this, how to use those values in real-live circumstances. That's indeed
> a question.

Some modeling includes a choice of diffusion, which has the potential of
improving agreement between modeling and reality.

> straightforward projects) and mathematical approximations. For me this seems as
> a logical empirical approach: collecting data, finding common patterns,
> investigating and describing. Trying does not guarantees optimum results. Not
> trying guarantees certainly NO result at all. The newsgroup (established by
> yourself, for which my respect) as I read, was also meant to bring the acoustic
> community together. I don't know of a better way to reach so many.

If we could ever codify the measurement, the cataloging and the model
application of sound absorption coefficients (normal incidence as well as random), it would indeed be a feather in our caps!

> If not one should accept that roomacoustics is only meant for people with very
> many years of experience, since no mathematical approach seems to allow any
> reasonable approximation.

The shoemaker has his favorite last and patterns; acousticians have their
favorite algorithms for room reverberance calculation. It's a happy world out there!

Cheers,

Ang. C.

--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor Reenviar

Higini Arau Puchades Ver perfil Más opciones 5 ene 2002, 18:33

- Mostrar texto de la cita -

Dear Angelo,

I am very intriguedwith exposed by you in this paragraph, and now I have great desire to know your experiencies about this subject. In the meantime I have searched in the Jour. Acoust.Soc.Am trying to meet a
paper of you in where were indicated the Eyring effect, however my chance have been bad. I would like me obtain more information to understand best your knowledgment.
However, I look, there is a physical law that never can be violated: The principle of energy conservation. And the Sabine coefficient absorption can violate when it is higher the unity.
I give a example, to see case 100 of J.R.Bistafa-J.S.Bradley, JASA 108(4) October,in this case we have a room of 9.20 m x 4.67 m x 3.56 m, the volume is 184.754 m3, the entire area walls is 152.952 m2.

The **reverberation** times empty room, in 500 Hz, are:
RT measured = 5.234 s
RT Sabine = 5.297 s
RT Eyring = 5.234 s
RT **Arau** = 5.234 s
m(air)= 0.0002
The surfaces of the room according Eyring have an alfa= 0.0245.
The absorption material has a alfa = 0.98 (500 Hz), measured by authors by ASTM procedure.
Placed the absorption materiak in ceiling, with area 42.269 m2,the authors measured and calculated for 500 Hz:
RT measured = 1.20 s
RT Sabine = 0.568 s
RT Eyring = 0.499
RT **Arau** = 1.177 s.
Now if we accept the RT measured as good I ask me what would be the
alfa Sabine of material, I answer it:
The mean coefficient of the room would be: alfa average = 0.13494/1.2
= 0.1124,
being 0.163V/S = 0.13494.
If now we calculate of absorption clearing (alfa mat) from:
42.269 alfa mat + 3.49085 = 184.754 x 0.11245
is obtained that Alfa mat = 0.4089.
Value well different to the obtained in ASTM test by authors.
Dear Angelo is possible that you explain your effect Eyring using this example?

Keeping with interest, your friend. Very regards. Higini

Responder al autor Reenviar

Angelo Campanella Ver perfil Más opciones 6 ene 2002, 03:24

- Mostrar texto de la cita -

Eyring (JASA, Jan. 1930, pp217-241) and others have observed that the
reverberation phenoenon, when involving highly absorbing rooms can
"better" be represented by -S*lg(1-alpha) than S*alpha.

> However, I look, there is a physical law that never can be violated:
> The principle of energy conservation. And the Sabine coefficient
> absorption can violate when it is higher the unity.

Clearly, the Eyring approximation will introduce the possibility that larger values of the Sabine approximation (don't all shoot at me at once!) can be greater than unity when the Eyring "alpha" value is not. But finally we must all realize that the "unity" we reference is not being applied to a physical reality, but merely a numeral generated according to a Standard measurement method. This "random incidence
absorption coefficient" was held out to us by Sabine himself as the ratio of the "sound absorbing power" of a specimen to its projected area. The fact that some device can absorb sound to a greater extent that is implied by its projecred area should not come as a surprise. Sabine's "power" is not the physical caories per second entity, but rather an an entity which I don't think he really defined much further, though indeed he, and others, certainly tried to do so on many occasions.

> I give a example, to see case 100 of J.R.Bistafa-J.S.Bradley, JASA
> 108(4) October,in this case we have a room of 9.20 m x 4.67 m x 3.56
> m, the volume is 184.754 m3, the entire area walls is 152.952 m2.
> The **reverberation** times empty room, in 500 Hz, are:

> RT measured = 5.234 s

To this point, you provide a rational picture

> RT Sabine = 5.297 s
> RT Eyring = 5.234 s
> RT **Arau** = 5.234 s

But how did you "calculate" the room RT? Did you use the wall
areas and
previously "known" absorption coeficients for all room surfaces?

- Mostrar texto de la cita -

Since all the material was located in one plane, the remaining
sound
field is NOT diffuse, so neither Eyring, nor Sabine formulas are
applicable. The closest approximation is that by Fitzroy (JASA, July,
1959, p 893), who treated each of the three directions separately.
There, you will find an Alpha result closer to your measurement. See
also "Acoustics" by Michael Rettinger, p 118 where he lists a trilogy of
results like the case you describe. The simple explanation is that
parallel surfaces without any absorption trap sound waves for a time
far beyond that expected from absorption area placed on the other
walls
in that room (my words). Fitzroy modeled that case.

> Dear Angelo is possible that you explain your effect Eyring using this
> example?

I can only say that you now have a good grasp of the conundrum
we
acoustical consultants face daily!

Angelo Campanella

--
--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to
hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor Reenviar

Angelo Campanella OOOPS! wrong Rettinger pag 6 ene 2002, 03:41

Higini Arau Puchades Ver perfil Más opciones

Angelo Campanella <a.campane...@worldnet.att.net> wrote in message
<news:3C37B95F.3050004@worldnet.att.net>...
> OOOPS! wrong Rettinger page:

> Angelo Campanella wrote:

> > There, you will find an Alpha result closer to your measurement. See
> > also "Acoustics" by Michael Rettinger, p 118 where he lists a trilogy of

> > results like the case you describe. The simple explanation is that

> Make that Page 87 in his 1969 edition and then Page 27 in his second
> edition "Acoustical Design and Noise Control", Vol. 1., 1977.

> Angelo Campanella

Dear Angelo Campanella,

I Know well all papers written by Fitzroy because his thought was the starting point and inspiration of my theory (1988).
The other day in my email group I forgot to write the RT Fitzroy for 500 Hz, the result calculated is: RT Fitroy = 2.925s while the measured by Bistafa- Bradley experiment,(year 2000), JASA 108(4)October, is RT measured = 1.20 s.
Therefore we have almoast 2.5 times RT Fitzroy greatest than RT experimental measured.
I wish clarify that when you say are my measurements it are measurements of Bistafa-Bradley and not mine.

I believe that problem posed in the begining by Eric Desart is difficult, that the truth is hidden behind a very thick cloud and therefore is very difficult to see it. Perhaps we have a good chance that it be so because through of it we can discuss with frienship trying discover something more.

Sincerely yours

Higini **Arau**

Responder al autor   Reenviar

Eric Desart Hello Higini, | Now if we accept the RT 6 ene 2002, 14:10
Eric Desart "Angelo Campanella" <a.campane...@ 6 ene 2002, 14:25
Higini Arau Puchades "Eric Desart" <af...@belgac 6 ene 2002, 21:40
Eric Desart Ver perfil Más opciones 6 ene 2002, 23:09

Hi Higini

First, thanks for your explanation.
Second, Sorry, I was wrong, I knew your paper was published in Acustica.

What kind of help?
I'm certainly not Shakespeare, my English is bad, and to be honest, yours isn't
much better. I also don't speak Spanish.

But I really should be honored, if I could assist in any way, within my many
limitations.
And I can not imagine that I should be alone.
So I don't know how to translate this in practical terms, but a solution should
and can be found.

I feel a bit helpless now, not knowing what to say, just that I'm impressed.
And hope that somehow a practical solution exists

My warm regards

Eric

"Higini **Arau** Puchades" <h.a...@terra.es> schreef in bericht
news:beec2401.0201061240.16700716@posting.google.com...
| "Eric Desart" <af...@belgacom.net> wrote in message
<news:3c384894$0$75155$ba620e4c@news.skynet.be>...
| > Hello Higini,
| >
| > | Now if we accept the RT measured as good I ask me what would be the
| > | alfa Sabine of material, I answer it:

| > | The mean coefficient of the room would be: alfa average =
0.13494/1.2
| > | = 0.1124,
| > | being 0.163V/S = 0.13494.
| > | If now we calculate of absorption clearing (alfa mat) from:
| > | 42.269 alfa mat + 3.49085 = 184.754 x 0.11245
| > | is obtained that Alfa mat = 0.4089.
| >
| > Can you please go in a bit deeper on your calculations?
| > What is this mean coefficient? 0.1124 (I see the formula + V/S +
RT60)
| > What is this 3.49085 (air?)?
|
| Dear Eric,
| I clarify a little my numbers.
| The averaged absorption coefficient of the room, assuming the RT
| experimental value determinated by Bistafa-Bradley,applying Sabine
| formula, would be :
| alfa averaged room = 0.163V /S RT = (0.163V/S)/RT
|
| alfa averaged room = 0.13494/1.2 = 0.1124,
| being 0.163V/S = 0.13494 and RTexperimental = 1.2
|
| If now we calculate the absorption of the ceiling: alfa mat, clearing
| up(alfa mat)from average mean value derived, we have:
|
| Surface ceiling x alfa mat+ Sum of area of remainder surfaces x alfa
| remainder = Area total of surfaces x mean absorption coefficient
room.
|
| 42.269 x alfa mat+ (0.695 + 65.504+ 33.2504)x 0.0245 = 184.754 x
| 0.1124
|
| 42.269 alfa mat + 3.49085 = 184.754 x 0.11245
|
| Clearing up alfa mat from this equation we obtain: alfa mat = 0.4089
=
| 0.41.
| (In reality the air absorption for this frequency is almoast
| negligible.)
|
| It implies that taking as good the RTexperimental below cited, and
| calculating with Sabine formula we would obtain an alfa mat well
| different to the measured by ASTM Standard in a Reverberant room.
This
| implies that the non diffuse
| soundfield introduces a decreasing of the absorption in the absorbent
| material.
| >
| > Since not everybody has easy access to old JASA papers, and
neither
Fitzroy,
| > nor your approach is integrated in lots of textbooks, to make
somehow a
paper,
| > explaining the approaches more in-depth, easier accessible?
| > This then could be made available on a website, wherever? I
understand this
can
| > be a lot of work, so yesterday is soon enough (sorry, stupid joke).
| > Since your Formula is basically based on an improved/extended
Fitzroy
approach,
| > I can't think of a better person to do so.
| >
| > Does your JASA paper exists in a form or document that can be put
on a
website?
| > (Not .pdf = bad readable if coming from a scanned document).
|
| Dear Eric, nor the paper of Fitzroy neither my paper, the first
| belonging to JASA and the other t Hirzel-Verlag, can be published

| without permission o editorial, and I do not know if is possible to
| obtain this permission.
| By I another hand I would be able and very honoured to prepare a text
| exposing both formula, theories and concepts, begining in my
| exposition with the thougth of Bagenal(1941) who was the pionner in
| this idea although he expressed it only verbally.
| I am a memeber associated, in possesion of my silver certificate, of
| the Acoustical Society of America. Ever I had wished be member
| honorary of this Society, but for it is required to show enough
| experience that never I get. Well, I remember when I went to Sabine
| Centennial (1995), I said me or I go now or never will go. I had need
| to go Boston to see the spaces in where Sabine run. The emotion was
| very great for me because I knew the Harvard University and MIT
| Institute, and knew those parks very calm, where I stayed thinking
| more theories that after I wrote. I believe that writing, that you
| proupose, about Fitzroy and mine theory I could get both things, to be
| member and also repeat the same and wonderfull sensations that I
| obtained in Boston.
| But for it I need a strong help because I am not Sheakspeare nor I do
| not know put websites having elaborated a document in PDF.
|
| Kind regards.
|
| Higini

Responder al autor Reenviar

Eric Desart "Eric Desart" <af...@belgacom.net> sci 7 ene 2002, 01:47

Angelo Campanella Ver perfil Más opciones 7 ene 2002, 02:31

Higini **Arau** Puchades wrote:
> I believe that problem posed in the begining by Eric Desart is
> difficult, that the truth is hidden behind a very thick cloud and
> therefore is very difficult to see it. Perhaps we have a good chance
> that it be so because through of it we can discuss with frienship
> trying discover something more.

Yes, we should do that.

I note further that in addition to the Eyring and Fitzroy adjustments for room geometry, Tom North wood investigated the effect of diffraction due to the edge and the size of the absorber panels. His was able to formulate and publish that realtionship in JASA (Northwood, Grisau and Medcof, JASA (31) 1959, pp 595-599. Later, he codified his modeling result in JASA (35). 1963, p 1174. In the latter, the relationship between panel size, wavelength acoustcal impedance and sound absorption was implemented into a graph.

I have extended that work by drawing a graph of alpha vs frequency, size input parametric, impedance input indicated, using Northwood's algorithms. Attempts at publishing this refinement has largely failed because of the editorial requirements of JASA. But I maintain it for my frequent personal use. It easliy represents and quantifies the "absorption greater than unity" values of normal specimens. Northwood's algoritm, derived from modeling an absorber as a narrow but infinitely long absorber, implies that this excess over unity has an asymptotic value of 8 for very tiny patches of absorber material. (That is, if one cuts an absorber into many tiny patches, the sound absorbing power of that arrangement could hypothetically be eight times that which occurred when that same material was a single large panel. The effect is very frequency dependednt, with the highest frequencies experiencing the

least, if any, increase). We will not achieve nearly that increase in practice. But it does make one want to advise architests to spread small
patches of sound absorbers all around a room rather than on a single wall or the ceiling.

Angelo Campanella.

--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to hold a reserve that would carry me through." - Charles A. Lindbergh.

alt.sci.physics.acoustics

Just an idea about absorption

Eric Desart Ver perfil Más opciones 3 ene 2002, 16:06

To ALL

This is may a stupid idea with limited chances.
I think most people busy with room acoustics are often confronted with the same
problem.

1) One has the measurement absorption data of different materials coming from
laboratories.
2) One does **Reverberation** measurements on site (e.g. industry) in order to
define the existing absorption, which then is translated in an existing A
(equivalent absorption).
3) One calculates the necessary A versus a target **reverberation** time.
4) One defines the difference between target A and existing A as being the to be
added A.
5) One divides the 'to be added A' by the Sabine values of the measurement
report, and one knows the number of m2 to be added in order to obtain the target
Reverberation Time.
6) The experienced acoustician knows that this calculation is not correct, and
will add a correction factor, which is mostly based on a trained instinct, own
database figures etc. etc..
Experience plays an extremely big roll here.

When one uses Sabine, Eyring, Millington, **Arau** Puchades, Fitzroy or still other
own improved or adjusted models, one is always confronted with the difference
between the Sabine values as measured in the laboratory, and the real alpha
values after being applied in real life circumstances.
Without knowing this for sure (I'm living in my own limited world). I think
that the Sabine approach is used the most, corrected by factors based on
experience, without having a real mathematical background (often given
scientific sounding names as diffusity, or efficiency factor and others).
If it should be possible to collect data from real life projects it should be
possible to find better mathematical or empirical relationships in function of
frequency, total A versus V/S and others.
I'm a bit familiar with working in laboratories, and have personally done lots
of measurements in Belgium, German and Netherlands official labs, and was
involved in many more.

I wonder, if the group can be an idea, to collect such data (even via
relationships with producers etc) in order to build a database, allowing

statistical analysis, and building some engineering curves, finding relationships etc.
Condition should be that the related projects are relative simple, in order to
exclude too much unknown influences and parameters, and that a good description
of the project is available. This includes technical description of the room,
good measurements before and after, clear lab data from the used material, how
it is used and so on.

If such data could become available, it must be possible to guarantee anonymity
where required, and availability of all data (anonymous if necessary) to all
parties contributing in any way. I'm almost certain Universities can be interested to be involved.

Is this idea just stupid, or can it have some potential?

Eric

Responder al autor Reenviar

Andre van der Merwe Ver perfil Más opciones 3 ene 2002, 17:39

I think it is a great idea -maybe post it on a central website, something we
all have.

Just one parameter i wish to add, that is the sound proofing characteristics
of the room enclosure ie the floor, walls and roof. We all know that 600mm
concrete let less sound escape than 16mm MDF, sure this will inflence the
absortion tests carried out on say 100mm thick fibreglass hardmounted on the
wall, specially in the lower frequencies.

your thoughts ?

regards

andre.

"Eric Desart" <af...@belgacom.net> wrote in message

news:3c347370$0$33516$ba620e4c@news.skynet.be...

- Mostrar texto de la cita -

Responder al autor Reenviar

Eric Desart Ver perfil Más opciones 3 ene 2002, 18:58

Hello Andre

I agree it should be done in a systematic way, meaning if such an idea should be
plausible, that someone, somehow should make a document, defining the necessary
parameters, allowing to do some valid subsequent study on this data.
Yours is certainly one since the absorption of your 100 mm fiberglass, can not
just be added to the absorption of your MDF or vice versa.

Just collecting data isn't enough. I really should see it as a basis for some
good statistical and mathematical investigation.

If you should get the allowance of companies as Rockwool Denmark, Ecomax,
Isover, Rockwool Netherlands and lots of others, don't speak about US yet, you
can fill such a site with hundreds if not thousands of measurements of their
basic materials. This has little sense

Furthermore there is the investment, and anonymity.
Information collected and measured over the years by companies, will be
rightfully protected (it are expensive company assets).
They rightfully will not just throw their expensively gathered know-how on the
street (as a matter of speech) for everybody to pick up.
Meaning that the final outcome should return useful information for them, to
compensate for the investment of cooperation, and guarantee that this can't harm
them directly or indirectly in any way (it's no fun to work for potential competition).
So maybe neutral institute's/organizations should be involved.

I'm not sure how to handle it, or even if this is a reasonable thought.
What I do believe is, that if enough quality information can be gathered, that
one finds somewhere an institute/organization/Univ. willing to study them.
This is information not easy to get by (in large enough quantity, with
systematical useful data, to do some good statistical/mathematical analysis).
I think huge manufactures of absorptive material, can have lots of project data,
which they provide (including measurements before/after) as a service for there
standard customers in the building walls/ceilings industry (in order to
sell/promote their own materials).

Eric

"Andre van der Merwe" <an...@acutec.net> schreef in bericht
news:iP%Y7.11126$pH1.108301@NewsReader...
| I think it is a great idea -maybe post it on a central website, something we
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|
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|
| regards
|
| andre.
|
| "Eric Desart" <af...@belgacom.net> wrote in message
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| all
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| > interested to be involved.
| >
| > Is this idea just stupid, or can it have some potential?
| >
| > Eric
| >
| >
| >
|
|

Responder al autor Reenviar

Higini Arau Puchades Ver perfil Más opciones

Dear Eric,
I think that your idea is excellent but it will be difficult be carried, because it implies a lot of technical people participating. Moreover in the measurement field we could have a strong problem, because I remember a case exposed by R.W. Young JASA 31 (1959),p. 912,case exposed also in my theory of 1988, p.176 case 8, in where he had a rectangular concrete room of volume 1350 ft3, with sound absorbing material (area 265 ft2) covering the ceiling and top third of side walls, at 1000 cps the effective Sabine coefficient was 0.25; but when the material was arranged in a border 1 ft wide around the ceiling area, (area border 46 ft2), the effective Sabine coefficient of the absorptive material was 0.95. It implies that Sabine absorption coefficient is very dependent of the ubication of material in the room and also possibly of its geometry. I look, with Robert Willi Young, that the Sabine coefficient is not a true coefficient of absorption. I believe that absorption coefficient of a material would must be measured in a reverberant room covering all surfaces of the room with the testing material , applying the Eyring formula. As it probably is very expensive, I think that we would have realise this testing puting the material in three mutually perpendiculars surfaces , for example: floor, one side wall, and rear wall, obviously applying also the Eyring formula.
The problem is that testing Standards all are thought with Sabine formula. If we will use the Eyring formula in the sense expressed below then we will be able to measure the energetic coefficients of the absorption of the material, what is independent of its position in the room.
However, my dear Eric, I think that your idea is good to start with something that during many years is stoped, or better: never explored.
See you¡

- Mostrar texto de la cita -

Responder al autor Reenviar

Stephen Gosling >Is this idea just stupid, or can it 3 ene 2002, 20:41
Eric Desart Response interleaved "Stephen Goslin 3 ene 2002, 22:44

Eric Desart Ver perfil Más opciones 3 ene 2002, 22:44

Response interleaved (learned that from Richard).
First: I certainly don't have all the answers, just searching if it could have
sense, and if then how.

"Higini **Arau** Puchades" <h.a...@terra.es> schreef in bericht
news:beec2401.0201031052.62d28c79@posting.google.com...
| Dear Eric,
| I think that your idea is excellent but it will be difficult be
| carried, because it implies a lot of technical people participating.

I understand, and the distance is unpractical, but maybe one can start with a
protected site only accessible for the (whoever) people involved. And just one
or few, collect data, and is responsible for uniformity and systematic in the
data.
Think the net when properly used can assist a lot.

| Moreover in the measurement field we could have a strong problem,
| because I remember a case exposed by R.W. Young JASA 31
(1959),.......shortened.............0.95. It implies that Sabine
| absorption coefficient is very dependent of the ubication of material
| in the room and also possibly of its geometry. I look, with Robert
| Willi Young, that the Sabine coefficient is not a true coefficient of
| absorption.

I know, and it's not possible to grasp all influencing parameters, therefor one
should only use project which can clearly be described.
But even the phenomena you describe, if enough data is available, can be (in a
certain degree) described and evaluated.

I once went in the **reverberation** room with 12 baffles, which I measured in any
way I could think of: Flat on the ground, vertical as baffels, with and without
surrounding frame, with and without surrounding frame in the empty room (as
reference), spread them over the floor surface, put them in corners, with and
without centre core in the baffles, in the edges of the room and so on, and so
on.
I put all curves on top of one another in one graph. Anytime a customer started
bean counting when comparing materials of different suppliers in view of alpha
S, I showed him the graph, asking which curve he did like best. He never could
believe that those were based on the same material measured in the same lab.
And indeed also some of my coleagues couldn't.
As a result of this test session the KULeuven (university) added additional
parameters in their ray-tracing model.

I believe that absorption coefficient ...., applying the Eyring formula. As it
............| The problem is that testing Standards all are thought with Sabine
| formula.

I agree that maybe other methods are or can be called for, but fact of the
matter is that for now all standards, world-wide are based on the same principle. I heard different suggestions already in relation to that, but that's for more clever guys than I am (to intrusive).

| However, my dear Eric, I think that your idea is good to start with
| something that during many years is stoped, or better: never explored.

I do thank you for the support, even when it's just wishful thinking

Kind regards

Responder al autor Reenviar

Brian Marston > I think it is a great idea -maybe pc 3 ene 2002, 23:40

Eric Desart Hello Brian, This is a bit a different sub 4 ene 2002, 01:21

Kari Pesonen Ver perfil Más opciones 4 ene 2002, 08:30

Eric,
Interesting idea and worth studying, but
- we know that **reverberation** time does not depend unequivocally on
  quantity and acoustical quality of absorption material and materials in room,
- this is why measuring methods that are based on measured **reverberation**
  time(s) do not give absorption coefficients that were unequivocal metrics
  of material quantity and quality or globally valid, but coefficients that are merely
  case by case, and also microphone and sound source position/characteristics,
  depended variables. We have to ask: what other variables we should
  use to normalize the data or/and to include in the data base to guarantee
  usability of data.
- one issue producing problems is the fact that in practice total room absorption
  (that one influencing **reverberation** time) consists of several different materials
  and other details/variables. How to extract the effects of separate materials?

besr regards

Kari Pesonen

--
E-mail: Kari.Peso...@hut.fi

- Mostrar texto de la cita -

Responder al autor Reenviar

Eric Desart "Kari Pesonen" <Kari.Pesonen@no_sp 4 ene 2002, 13:22

Eric Desart Hello Kari Sorry part of a sentence rem 4 ene 2002, 14:16

Angelo Campanella Ver perfil Más opciones 4 ene 2002, 18:12

Eric Desart wrote:
> This e factor then is substituted by an empirical defined factor.
> That's also why more data should be useful to have better statistics.

To give you an idea of the vagaries involved in this whole sound absorption lab/field/design/result conundrum, note the instructions

proffered to commission a laboratory test **reverberation** room (viz. ASTM
C423-99a):
(A sound absorber specimen totaling 72 square feet is assembled on the
test room floor. It is known that the sound field in the test room
initially is NOT diffuse.)
Then diffuser panels, typically 3/4" plywood, are mounted at random
positions and orientations in the **reverberation** room in a feverish
attempt at destroying as many standing wave patterns as possible. The
following is the (1999 version) cook-book instructions on how to make a
test room diffuse:

"X1.2.2.2 Sound absorption measurements are made on the test specimen
with no diffusers, with a small number of diffusers (approximately 5
square meters), and as the quantity of diffusers is increased in 5 Sq.m
steps.

"X1.2.2.3 For each set of measurements the mean value of the sound
absorption coefficients, in the range 500 to 4000 Hz, is calculated and
these values are plotted against the total area or number of diffusers
used in each case.

"X1.2.2.4 It will be found that the mean sound absorption coefficient
approaches a maximum and thereafter remains constant or decreases with
increasing numbers of diffusers. The optimum total area or number of
diffusers is chosen as that which first achieves the maximum value.

NOTE X1.1- From experience, it has been found in rectangular rooms the
area (both sides) of diffusers required to achieve satisfactory
diffusion is 15% to 25% of the total surface area of the room."

It is clear (to me, anyway) that:

1- This is a treasure hunt for producing the greatest absorption values
possible in a "credible" fashion.

2- Results below 500 Hz will not be for a diffuse field.

3- Practical rooms we live, play and work in hardly ever get this degree
of diffusion except by accident (viz., storage room, room under
construction, etc.)

4- Results are precise only for a 9'x8' sound absorber panel laid on the
floor of a large room!!!!!!!!!

In our individual and respectful ways, we each have to transfer these
ideal diffuse 9x8-on-the-floor coefficients to practical, different
sized rooms with different treatment areas and location configurations.

Lots of luck!

Angelo Campanella

--
--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to
hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor Reenviar

Eric Desart "Angelo Campanella" <a.campane...@ 5 ene 2002, 02:31

Angelo Campanella Ver perfil Más opciones 5 ene 2002, 06:51

Eric Desart wrote:
> What about the simple Sabine example? Why just selecting this sentence?
> For me it's about the principle (in this case just extended to a better Eyring
> approach).

The laboratory ,method uses the simple Sabine formula for it s computation. The room is operated empty, giving the room's inherent absorption in sabines (US) or square meters (ISO). Then the specimen is
carried in and put in it's empirically favored position, then the room is operated again, producing a new and larger absorption "area". The difference in "area" is then divided by the physical (fascia) area reported as the random incidence sound absorption coefficient.

Several years ago, I calculated the entire process using the Eyring (A
substituted with -S*lg(1-alpha)), where S is the entire room surface area and alpha is the AVERAGE absorption coefficient over that entire area, S. This indeed made a difference, but it was very slight, perhaps 0.01 for an absorption coefficient of nearly 1.0. The twist of fate is that the alpha in the formula is not that of the specimen, but that of all S. In that way, the Eyring effect is never seen in **reverberation** room tests. But we certainly encounter the divergence of Eyring absorption from sabine absorption in practical habitable rooms. Again, the Eyring effect is a mathematical fact, not a physical phenomenon. Our
quest remains to find an adequate simulation of reality. The reason why
"absorption coefficients" greater than 1.0 are "measured and reported remains to be discussed another day, as it is even more perplexing.

> The most common used calculation method simply ignores the interactive effect
> with the existing absorption in the room. Never understood why. An extremely
> simple formula can already improve on that (see example).

I think I have explained how this "interaction" is handled in laboratory methodology and calculation.

> I don't think (to me) it's a hunt for the greatest absorption value, but trying
> to assure equality between different laboratories, which can be obtained by
> optimizing the diffuse field, rather then hoping that modal problems between
> laboratories will be similar and return the same absorption results.

OK, I was trying to be humorous. You are right in that one can hope for
unification via maximized diffusion. Don't we all await the day when frequencies lower that 500 Hz are included. But, I ask, can we argue that the status quo is proper???

> The Sabine approach is known and accepted as being valid for highly diffuse
> fields (only then it will ca equal the Eyring approach).
> The lab Sabine values have shown to be a valid input for ray-tracing models (as
> per studies in KULeuven I know about).

> Knowing this, how to use those values in real-live circumstances.
 That's indeed
> a question.

Some modeling includes a choice of diffusion, which has the potential of
improving agreement between modeling and reality.

> straightforward projects) and mathematical approximations. For me this seems as
> a logical empirical approach: collecting data, finding common patterns,
> investigating and describing. Trying does not guarantees optimum results. Not
> trying guarantees certainly NO result at all. The newsgroup (established by
> yourself, for which my respect) as I read, was also meant to bring the acoustic
> community together. I don't know of a better way to reach so many.

If we could ever codify the measurement, the cataloging and the model
application of sound absorption coefficients (normal incidence as well as random), it would indeed be a feather in our caps!

> If not one should accept that roomacoustics is only meant for people with very
> many years of experience, since no mathematical approach seems to allow any
> reasonable approximation.

The shoemaker has his favorite last and patterns; acousticians have their
favorite algorithms for room reverberance calculation. It's a happy world out there!

Cheers,

Ang. C.

--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor Reenviar

Higini Arau Puchades Ver perfil Más opciones 5 ene 2002, 18:33

- Mostrar texto de la cita -

Dear Angelo,

I am very intriguedwith exposed by you in this paragraph, and now I have great desire to know your experiencies about this subject. In the meantime I have searched in the Jour. Acoust.Soc.Am trying to meet a
paper of you in where were indicated the Eyring effect, however my chance have been bad. I would like me obtain more information to understand best your knowledgment.
However, I look, there is a physical law that never can be violated: The principle of energy conservation. And the Sabine coefficient absorption can violate when it is higher the unity.
I give a example, to see case 100 of J.R.Bistafa-J.S.Bradley, JASA 108(4) October,in this case we have a room of 9.20 m x 4.67 m x 3.56 m, the volume is 184.754 m3, the entire area walls is 152.952 m2.

The **reverberation** times empty room, in 500 Hz, are:
RT measured = 5.234 s
RT Sabine = 5.297 s
RT Eyring = 5.234 s
RT **Arau** = 5.234 s
m(air)= 0.0002
The surfaces of the room according Eyring have an alfa= 0.0245.
The absorption material has a alfa = 0.98 (500 Hz), measured by authors by ASTM procedure.
Placed the absorption materiak in ceiling, with area 42.269 m2,the authors measured and calculated for 500 Hz:
RT measured = 1.20 s
RT Sabine = 0.568 s
RT Eyring = 0.499
RT **Arau** = 1.177 s.
Now if we accept the RT measured as good I ask me what would be the
alfa Sabine of material, I answer it:
The mean coefficient of the room would be: alfa average = 0.13494/1.2
= 0.1124,
being 0.163V/S = 0.13494.
If now we calculate of absorption clearing (alfa mat) from:
42.269 alfa mat + 3.49085 = 184.754 x 0.11245
is obtained that Alfa mat = 0.4089.
Value well different to the obtained in ASTM test by authors.
Dear Angelo is possible that you explain your effect Eyring using this example?

Keeping with interest, your friend. Very regards. Higini

Responder al autor Reenviar

Angelo Campanella Ver perfil Más opciones 6 ene 2002, 03:24

- Mostrar texto de la cita -

Eyring (JASA, Jan. 1930, pp217-241) and others have observed that the
reverberation phenoenon, when involving highly absorbing rooms can
"better" be represented by -S*lg(1-alpha) than S*alpha.

> However, I look, there is a physical law that never can be violated:
> The principle of energy conservation. And the Sabine coefficient
> absorption can violate when it is higher the unity.

Clearly, the Eyring approximation will introduce the possibility that larger values of the Sabine approximation (don't all shoot at me at once!) can be greater than unity when the Eyring "alpha" value is not. But finally we must all realize that the "unity" we reference is not being applied to a physical reality, but merely a numeral generated according to a Standard measurement method. This "random incidence
absorption coefficient" was held out to us by Sabine himself as the ratio of the "sound absorbing power" of a specimen to its projected area. The fact that some device can absorb sound to a greater extent that is implied by its projecred area should not come as a surprise. Sabine's "power" is not the physical caories per second entity, but rather an an entity which I don't think he really defined much further, though indeed he, and others, certainly tried to do so on many occasions.

> I give a example, to see case 100 of J.R.Bistafa-J.S.Bradley, JASA
> 108(4) October,in this case we have a room of 9.20 m x 4.67 m x 3.56
> m, the volume is 184.754 m3, the entire area walls is 152.952 m2.
> The **reverberation** times empty room, in 500 Hz, are:

> RT measured = 5.234 s

To this point, you provide a rational picture

> RT Sabine = 5.297 s
> RT Eyring = 5.234 s
> RT **Arau** = 5.234 s

But how did you "calculate" the room RT? Did you use the wall areas and
previously "known" absorption coeficients for all room surfaces?

- Mostrar texto de la cita -

Since all the material was located in one plane, the remaining sound
field is NOT diffuse, so neither Eyring, nor Sabine formulas are applicable. The closest approximation is that by Fitzroy (JASA, July, 1959, p 893), who treated each of the three directions separately. There, you will find an Alpha result closer to your measurement. See also "Acoustics" by Michael Rettinger, p 118 where he lists a trilogy of results like the case you describe. The simple explanation is that parallel surfaces without any absorption trap sound waves for a time far beyond that expected from absorption area placed on the other walls
in that room (my words). Fitzroy modeled that case.

> Dear Angelo is possible that you explain your effect Eyring using this
> example?

I can only say that you now have a good grasp of the conundrum we
acoustical consultants face daily!

Angelo Campanella

--
--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor Reenviar

Angelo Campanella OOOPS! wrong Rettinger pag 6 ene 2002, 03:41

Higini Arau Puchades Ver perfil Más opciones

Angelo Campanella <a.campane...@worldnet.att.net> wrote in message
<news:3C37B95F.3050004@worldnet.att.net>...
> OOOPS! wrong Rettinger page:

> Angelo Campanella wrote:

> > There, you will find an Alpha result closer to your measurement. See
> > also "Acoustics" by Michael Rettinger, p 118 where he lists a trilogy of

> > results like the case you describe. The simple explanation is that

> Make that Page 87 in his 1969 edition and then Page 27 in his second
> edition "Acoustical Design and Noise Control", Vol. 1., 1977.

> Angelo Campanella

Dear Angelo Campanella,

I Know well all papers written by Fitzroy because his thought was the starting point and inspiration of my theory (1988).
The other day in my email group I forgot to write the RT Fitzroy for 500 Hz, the result calculated is: RT Fitroy = 2.925s while the measured by Bistafa- Bradley experiment,(year 2000), JASA 108(4)October, is RT measured = 1.20 s.
Therefore we have almoast 2.5 times RT Fitzroy greatest than RT experimental measured.
I wish clarify that when you say are my measurements it are measurements of Bistafa-Bradley and not mine.

I believe that problem posed in the begining by Eric Desart is difficult, that the truth is hidden behind a very thick cloud and therefore is very difficult to see it. Perhaps we have a good chance that it be so because through of it we can discuss with frienship trying discover something more.

Sincerely yours

Higini **Arau**

Responder al autor Reenviar

Eric Desart Hello Higini, | Now if we accept the RT 6 ene 2002, 14:10
Eric Desart "Angelo Campanella" <a.campane...@ 6 ene 2002, 14:25
Higini Arau Puchades "Eric Desart" <af...@belgac 6 ene 2002, 21:40
Eric Desart Ver perfil Más opciones 6 ene 2002, 23:09

Hi Higini

First, thanks for your explanation.
Second, Sorry, I was wrong, I knew your paper was published in Acustica.

What kind of help?
I'm certainly not Shakespeare, my English is bad, and to be honest, yours isn't
much better. I also don't speak Spanish.

But I really should be honored, if I could assist in any way, within my many
limitations.
And I can not imagine that I should be alone.
So I don't know how to translate this in practical terms, but a solution should
and can be found.

I feel a bit helpless now, not knowing what to say, just that I'm impressed.
And hope that somehow a practical solution exists

My warm regards

Eric

"Higini **Arau** Puchades" <h.a...@terra.es> schreef in bericht
news:beec2401.0201061240.16700716@posting.google.com...
| "Eric Desart" <af...@belgacom.net> wrote in message
<news:3c384894$0$75155$ba620e4c@news.skynet.be>...
| > Hello Higini,
| >
| > | Now if we accept the RT measured as good I ask me what would be the
| > | alfa Sabine of material, I answer it:

| > | The mean coefficient of the room would be: alfa average =
0.13494/1.2
| > | = 0.1124,
| > | being 0.163V/S = 0.13494.
| > | If now we calculate of absorption clearing (alfa mat) from:
| > | 42.269 alfa mat + 3.49085 = 184.754 x 0.11245
| > | is obtained that Alfa mat = 0.4089.
| >
| > Can you please go in a bit deeper on your calculations?
| > What is this mean coefficient? 0.1124 (I see the formula + V/S +
RT60)
| > What is this 3.49085 (air?)?
|
| Dear Eric,
| I clarify a little my numbers.
| The averaged absorption coefficient of the room, assuming the RT
| experimental value determinated by Bistafa-Bradley,applying Sabine
| formula, would be :
| alfa averaged room = 0.163V /S RT = (0.163V/S)/RT
|
| alfa averaged room = 0.13494/1.2 = 0.1124,
| being 0.163V/S = 0.13494 and RTexperimental = 1.2
|
| If now we calculate the absorption of the ceiling: alfa mat, clearing
| up(alfa mat)from average mean value derived, we have:
|
| Surface ceiling x alfa mat+ Sum of area of remainder surfaces x alfa
| remainder = Area total of surfaces x mean absorption coefficient
room.
|
| 42.269 x alfa mat+ (0.695 + 65.504+ 33.2504)x 0.0245 = 184.754 x
| 0.1124
|
| 42.269 alfa mat + 3.49085 = 184.754 x 0.11245
|
| Clearing up alfa mat from this equation we obtain: alfa mat = 0.4089
=
| 0.41.
| (In reality the air absorption for this frequency is almoast
| negligible.)
|
| It implies that taking as good the RTexperimental below cited, and
| calculating with Sabine formula we would obtain an alfa mat well
| different to the measured by ASTM Standard in a Reverberant room.
This
| implies that the non diffuse
| soundfield introduces a decreasing of the absorption in the absorbent
| material.
| >
| > Since not everybody has easy access to old JASA papers, and
neither
Fitzroy,
| > nor your approach is integrated in lots of textbooks, to make
somehow a
paper,
| > explaining the approaches more in-depth, easier accessible?
| > This then could be made available on a website, wherever? I
understand this
can
| > be a lot of work, so yesterday is soon enough (sorry, stupid joke).
| > Since your Formula is basically based on an improved/extended
Fitzroy
approach,
| > I can't think of a better person to do so.
| >
| > Does your JASA paper exists in a form or document that can be put
on a
website?
| > (Not .pdf = bad readable if coming from a scanned document).
|
| Dear Eric, nor the paper of Fitzroy neither my paper, the first
| belonging to JASA and the other t Hirzel-Verlag, can be published

| without permission o editorial, and I do not know if is possible to
| obtain this permission.
| By I another hand I would be able and very honoured to prepare a text
| exposing both formula, theories and concepts, begining in my
| exposition with the thougth of Bagenal(1941) who was the pionner in
| this idea although he expressed it only verbally.
| I am a memeber associated, in possesion of my silver certificate, of
| the Acoustical Society of America. Ever I had wished be member
| honorary of this Society, but for it is required to show enough
| experience that never I get. Well, I remember when I went to Sabine
| Centennial (1995), I said me or I go now or never will go. I had need
| to go Boston to see the spaces in where Sabine run. The emotion was
| very great for me because I knew the Harvard University and MIT
| Institute, and knew those parks very calm, where I stayed thinking
| more theories that after I wrote. I believe that writing, that you
| proupose, about Fitzroy and mine theory I could get both things, to be
| member and also repeat the same and wonderfull sensations that I
| obtained in Boston.
| But for it I need a strong help because I am not Sheakspeare nor I do
| not know put websites having elaborated a document in PDF.
|
| Kind regards.
|
| Higini

Responder al autor Reenviar

Eric Desart "Eric Desart" <af...@belgacom.net> sc 7 ene 2002, 01:47

Angelo Campanella Ver perfil Más opciones 7 ene 2002, 02:31

Higini **Arau** Puchades wrote:
> I believe that problem posed in the begining by Eric Desart is
> difficult, that the truth is hidden behind a very thick cloud and
> therefore is very difficult to see it. Perhaps we have a good chance
> that it be so because through of it we can discuss with frienship
> trying discover something more.

Yes, we should do that.

I note further that in addition to the Eyring and Fitzroy adjustments for room geometry, Tom North wood investigated the effect of diffraction
due to the edge and the size of the absorber panels. His was able to formulate and publish that realtionship in JASA (Northwood, Grisau and
Medcof, JASA (31) 1959, pp 595-599. Later, he codified his modeling result in JASA (35). 1963, p 1174. In the latter, the relationship between panel size, wavelength acoustcal impedance and sound absorption
was implemented into a graph.
I have extended that work by drawing a graph of alpha vs frequency, size
input parametric, impedance input indicated, using Northwood's algorithms. Attempts at publishing this refinement has largely failed because of the editorial requirements of JASA. But I maintain it for my frequent personal use. It easliy represents and quantifies the "absorption greater than unity" values of normal specimens. Northwood's
algoritm, derived from modeling an absorber as a narrow but infinitely long absorber, implies that this excess over unity has an asymptotic value of 8 for very tiny patches of absorber material. (That is, if one cuts an absorber into many tiny patches, the sound absorbing power of
that arrangement could hypothetically be eight times that which occurred
when that same material was a single large panel. The effect is very frequency dependednt, with the highest frequencies experiencing the

least, if any, increase). We will not achieve nearly that increase in practice. But it does make one want to advise architests to spread small
patches of sound absorbers all around a room rather than on a single wall or the ceiling.

Angelo Campanella.

--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to hold a reserve that would carry me through." - Charles A. Lindbergh.

RT60 calculation (Long message) from 05 Nov to 09 Nov Some Remarks

Opciones

9 mensajes - Contraer todos

Higini Arau Puchades Ver perfil Más opciones 1 ene 2002, 16:18

Dear AME, Yin Woon Pin, Noral D.Stwart, Eric Desart, Bill Davies, Gary
Sokolich.

I have delayed to the feast. Happy new year¡

I am pleased in contact with you to explain as my formula must applied. And perhaps I explain as must be used Fitzroy formula. However I do not Knew how Fitzroy thought , I believe equall to Sabine.

Working with my formula is required that we think in different form that the Sabine, or Eyring, formulae are used.
1. In a rectangular room we have none problem, Sabine, Eyring, Fitzroy
and **Arau** formulae are applied of same form, because the real area of main surfaces are coincidental with the projected areas.
But when we have, for example a hall with a sloped floor, then Sabine, Eyring, formulae considers this surface contained only in one main surface, for example the real floor. However for **Arau** formula ever must be realised a decomposition of the area in projected areas above each direction.
I look the room, appliying my formula, in sections as the architectural plans observe the room.
Then these projected areas must be added in your corresponding direction and also had in account as absorption in each direction.
Therefore the projected areas be are added as real surfaces added them
and also had in accounting as absorption surfaces.
The same form must be operated in any other direction that it happens.

2. If several surfaces are producing a relief, or prominence, above a main surface, they must be account as producing absorption units but not be considered as increasing the geometrical area of its main surfaces.

3. If a material is placed in strips above a main surface then diffraction or edge effect increases its absorption, and therefore these absorption coefficients must be increased according one law developed by Ten Wolde[1]:
alfastrip = alfatest ASTM + betaE, we obtain the following values of beta by frequencies,
[1] T. Ten Wolde (1967) Measurement on the Edge-Effect in **Reverberation** Rooms. Acustica. Vol.18 pp.207-212.
By other hand I give data of RT60 calculated for a room of 8 m x 8 m x 8 m, where the absorption 0.8 is placed in the ceiling and 0.02 absorption is placed in walls.

TR Fitzroy	7.264
TR **Arau**	3.604
TR Sabine	1.440

TR Eyring 1.329
However the same results are obtained if 0.80 is placed in a one wall
with 0.02 is ubicated in remaining surfaces. The Fitzroy RT60 is
highest.

Sincerely yours
Higini

Responder al autor Reenviar

Desart Eric Ver perfil Más opciones 1 ene 2002, 18:18

Hello Higini

Most welcome here

Just a question:
You use the projected area rather than the real surface.
How do you count then for the alpha value to be used? If I assume
that you use
the total absorption available on the real surface divided by the
projected
surface, to obtain a new alpha value? Is that correct?

It's in fact a bit the way I use mostly for the Eyring approach, and
Sabine
where surfaces are used (mostly only calculating with V)? I never saw
it
explicit described, but interpreted it more as acoustic boundaries
(depending on
mood and circumstances).

Still have to find a copy of the
[1] T. Ten Wolde (1967) Measurement on the Edge-Effect in
| **Reverberation** Rooms. Acustica. Vol.18 pp.207-212.

Kind regards

Eric

"Higini **Arau** Puchades" <h.a...@terra.es> schreef in bericht
news:beec2401.0201010718.597831ab@posting.google.com...
| Dear AME, Yin Woon Pin, Noral D.Stwart, Eric Desart, Bill Davies,
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| Working with my formula is required that we think in different form
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Sabine,
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| each direction.

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| Therefore the projected areas be are added as real surfaces added them
| and also had in accounting as absorption surfaces.
| The same form must be operated in any other direction that it happens.
|
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| main surface, they must be account as producing absorption units but
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| surfaces.
|
| 3. If a material is placed in strips above a main surface then
| diffraction or edge effect increases its absorption, and therefore
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|
| TR **Arau** 3.604
|
| TR Sabine 1.440
|
| TR Eyring 1.329
| However the same results are obtained if 0.80 is placed in a one wall
| with 0.02 is ubicated in remaining surfaces. The Fitzroy RT60 is
| highest.
|
|
| Sincerely yours
| Higini

Responder al autor Reenviar

Kari Pesonen Ver perfil Más opciones 1 ene 2002, 19:20

- Mostrar texto de la cita -

.. snip...
Another (of the many edge effect) source(s), perhaps easier accessible
Bartel T W, Effect of absorber geometry on apparent absorption coefficients
as measured in a **reverberation** chamber, J. Acoust. Soc. Am. 69 (1981)4
1065 -1074.
Have also a look at the list of references.

all the best for the year 2002

Kari Pesonen

--
E-mail: Kari.Peso...@hut.fi
On sauna hours: Kari.Peso...@sauna.cs.hut.fi

Responder al autor Reenviar

Higini Arau Puchades Ver perfil Más opciones

Hello Desart and Karin,

For me is a pleasure to meet with you.

Desart is christian name as Higini or it is Eric? For me it is very difficult because ever fail in this question.

The question formulated by you is complicated, and perhaps never will be solved.
In rectangular rooms we must accept that area real is the same than projected. It is coincidental. In this case we have not problem.
However we can imagine now we have a hall, for example with a floor very sloped, in where the real bottom wall is very small, almoast negligible, we assume be zero. What is in this case the bottom rear wall? For me it is the projected floor as is obsrved in a transversal section of the hall. And this case I multiply the absorption coeficient by the projected area to x and z direcctions: alfa x Sx = alfa x S cos beta and alfa x Sz = alfa x S sin beta.
, being beta the angle formed by audience plane with the horizontal and A the real floor area. The sound incidence angle Theta = 90 - beta.
We know that the power absorbed by a boundary surface S change with the angle of incidence. Therefore we have that the absorbed power decreases because the surface intercepts only the projected area S cos theta on the incident wave. By another hand we have also that the absorption coefficient alfa depends on angle of incidence according alfa theta = alfa 0 / cos theta, where alfa o is the absorption coefficient for perpendicular incidence. Writing the projected areas in function the incidence angle theta and finding the absorption units in each direction, having this angle variation of the absorption, we have:
Ax = (alfa o/ cos theta)x S sin theta = S alfa 0 tan theta
Az = (alfa 0 / cos theta) x S cos theta = S alfa 0
Knowing that the coefficient absorption has its maximum value for normal incidence, and being normally the angle theta, with relation to sloped floor, will be an angle less to 45º, I look then that the mistake produced will be small.

In relation to Kari, I know that the Bartel paper. With edge effect I wish to express the absorption increasing produced by edge when the material is placed on strips.

I go to sleep. My wishes for the year 2002. Goodby. Higini

- Mostrar texto de la cita -

Responder al autor Reenviar

Angelo Campanella Ver perfil Más opciones 2 ene 2002, 07:14

Desart Eric wrote:
> It's in fact a bit the way I use mostly for the Eyring approach, and Sabine
> where surfaces are used (mostly only calculating with V)? I never saw it
> explicit described, but interpreted it more as acoustic boundaries (depending on
> mood and circumstances).

Some years ago, after an exhaustive search and study to explain the "edge
effect" and alpha'a greater than 1.0 for 72 sq.ft. specimens (per ASTM C423), I concluded that representations of the **reverberation** time are

but approximations convenient to the situation. Two clear instances plus
an important fact arise:

1- Little room absorption, characteristic of **reverberation** room testing.

2- Much (major) room absorption; studios, outdoors, stadiums. Here the
use of the "test results" from 1- are misleading since absorption areas
in sabines can exceed the actual wall surface sabine area! Clearly this
is an anomaly of mathematics being applied outside the range of its
validity. The overall phenomenon of sound absorption in a closed room
is a 3-dimensional phenomenon. No single - or even a small number of -
scalar or one-dimensional mathematical relations is or are going to
properly represent RT any more than in radio, one-dimensional
transmission line theory could explain the impedance and pattern
behavior of antennas.

3- Whereas common **reverberation** mathematics is oblivious to wavelength
effects, sound wave scattering and absorption are very much sensitive to
said effects. It is quite likely that one of your formulations fairly
represents low frequency sound behavior, but it will also fall short of
representing the absorption of high frequency sound. This is especially
evident above 2,000 Hz.

So, folks, knock yourself out in your search for the Holy Grail of RT60
prediction. I use a series of approximations and "constants" accumulated
over decades of RT manipulation to the content of architects, and
building owners.

When you have had your fill of such Odysseys, build your own library of
"factors" based on real world experience accumulated to date.

Cheers,

Angelo Campanella.

--
--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to
hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor Reenviar

Angelo Campanella Ver perfil Más opciones 2 ene 2002, 07:19

Kari Pesonen wrote:
> Another (of the many edge effect) source(s), perhaps easier accessible
> Bartel T W, Effect of absorber geometry on apparent absorption coefficients
> as measured in a **reverberation** chamber, J. Acoust. Soc. Am. 69(1981)4
> 1065 -1074.

You will note that Bartel cut off his data below 250 Hz, since the
"diffuse" conditions and wavelengths equal to or smaller than the size
of the test specimens did not exist at lower frequencies (my
explanation. This is not any help at 125, 63 Hz where a lot of noise
reduction problems remain confronting us.

Cheers,
Angelo Campanella

--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor Reenviar

Desart Eric Ver perfil Más opciones 2 ene 2002, 09:39

Hi Angelo

Accept your comments completely.
It remains difficult and experience is an extremely important factor.
Sabine is indeed only valid for highly reverberant fields, and his linear approach leads to those mathematical impossibilities.

Still I never studied (years ago) the 'Aura Puchades' formula, you once told me
that you often use the Fitzroy approach (which I also didn't know), the differences as you can see them in the example Higini calculated, are significant.
It's useful for me to understand and feel the theoretical approaches. How, when
and where to apply them, which doesn't make insight and experience less
important.

Eric

"Angelo Campanella" <a.campane...@worldnet.att.net> schreef in bericht
news:3C32A545.50703@worldnet.att.net...
| Desart Eric wrote:

|
|
| > It's in fact a bit the way I use mostly for the Eyring approach, and Sabine
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| > explicit described, but interpreted it more as acoustic boundaries (depending on
| > mood and circumstances).
|
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| C423), I concluded that representations of the **reverberation** time are
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|
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| over decades of RT manipulation to the content of architects, and
| building owners.
|
| When you have had your fill of such Odysseys, build your own library of
| "factors" based on real world experience accumulated to date.
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| Cheers,
|
| Angelo Campanella.
| --
| --------- www.CampanellaAcoustics.com ---------
| ------ a.campane...@worldnet.att.net ------
| "I have simply studied carefully whatever I've undertaken, and tried to
| hold a reserve that would carry me through." - Charles A. Lindbergh.
|

Responder al autor Reenviar

Desart Eric Ver perfil Más opciones

Thanks Higini

Must think about your explanation.

By the way, my first name is Eric (Norwegian from origin I'm told). Just by a
stupid Email address problems in the beginning, where the 'Eric Desart' vers
failed to work I got it reversed. Since it is a common practice here in
official documents in Belgium to put the Family name first (as such not wrong
I just left it that way (bit lazy from me, just happy it worked).

Eric

PS: the link you gave in the silencers message should be:
http://www.librenie.com.co/ instead of :
http://www.librerie.com.co/
Speak (a bit) a few languages but Spanish isn't one of them.

"Higini **Arau** Puchades" <h.a...@terra.es> schreef in bericht
news:beec2401.0201011750.2e7897cf@posting.google.com...
| Hello Desart and Karin,
|
| For me is a pleasure to meet with you.
|
| Desart is christian name as Higini or it is Eric? For me it is very
| difficult because ever fail in this question.
|
| The question formulated by you is complicated, and perhaps never will
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| In rectangular rooms we must accept that area real is the same than
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| However we can imagine now we have a hall, for example with a floor
| very sloped, in where the real bottom wall is very small, almoast
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| section of the hall. And this case I multiply the absorption
| coeficient by the projected area to x and z direcctions: alfa x Sx =
| alfa x S cos beta and alfa x Sz = alfa x S sin beta.
| , being beta the angle formed by audience plane with the horizontal
| and A the real floor area. The sound incidence angle Theta = 90 -
| beta.
| We know that the power absorbed by a boundary surface S change with
| the angle of incidence. Therefore we have that the absorbed power
| decreases because the surface intercepts only the projected area S cos
| theta on the incident wave. By another hand we have also that the
| absorption coefficient alfa depends on angle of incidence according
| alfa theta = alfa 0 / cos theta, where alfa o is the absorption
| coefficient for perpendicular incidence. Writing the projected areas
| in function the incidence angle theta and finding the absorption units
| in each direction, having this angle variation of the absorption, we
| have:
| Ax = (alfa o/ cos theta)x S sin theta = S alfa 0 tan theta
| Az = (alfa 0 / cos theta) x S cos theta = S alfa 0
| Knowing that the coefficient absorption has its maximum value for
| normal incidence, and being normally the angle theta, with relation to
| sloped floor, will be an angle less to 45º, I look then that the
| mistake produced will be small.
|
| In relation to Kari, I know that the Bartel paper. With edge effect I
| wish to express the absorption increasing produced by edge when the
| material is placed on strips.
|
| I go to sleep. My wishes for the year 2002. Goodby. Higini
|
|

| "Kari Pesonen" <Kari.Pesonen@no_spam.welho.com> wrote in message
<news:a0sua8kvt1@nyytiset.pp.htv.fi>...
| > "Desart Eric" <af...@belgacom.net> wrote in message
news:3c31ef77$0$33498$ba620e4c@news.skynet.be...
| > > Hello Higini
| > >
| > > Most welcome here
| > >
| > > Just a question:
| > > You use the projected area rather than the real surface.
| > > How do you count then for the alpha value to be used? If I assume tha
you use
| > > the total absorption available on the real surface divided by the
projected
| > > surface, to obtain a new alpha value? Is that correct?
| > >
| > > It's in fact a bit the way I use mostly for the Eyring approach, and
Sabine
| > > where surfaces are used (mostly only calculating with V)? I never saw
| > > explicit described, but interpreted it more as acoustic boundaries
(depending on
| > > mood and circumstances).
| > >
| > > Still have to find a copy of the
| > > [1] T. Ten Wolde (1967) Measurement on the Edge-Effect in
| > > **Reverberation** Rooms. Acustica. Vol.18 pp.207-212.
| > .. snip...
| > Another (of the many edge effect) source(s), perhaps easier accessible
| > Bartel T W, Effect of absorber geometry on apparent absorption coefficie
| > as measured in a **reverberation** chamber, J. Acoust. Soc. Am. 69(198
| > 1065 -1074.
| > Have also a look at the list of references.
| >
| > all the best for the year 2002
| >
| > Kari Pesonen

Responder al autor Reenviar

Kari Pesonen Ver perfil Más opciones 2 ene 2002, 11:00

Some interesting papers for those who want to have little more insight
and questions to reververation predictability problems:

Mankovsky V S, Acoustics of studios and auditoria, Focal Press,
1971, 395 p. (e.g., abs.coeff. formulas 3.21 - 3.23)
Gibbs B M, Jones D K, A simple methods for calculating the
distribution
of sound pressure level within an enclosure, Acustica 26(1972)1, 24
- 32.
Mehta M L, Mulholland K A, Effect of non-uniform distribution of
absorption
on **reverberation** time, J. Sound Vibr. 46(1976)2, 209 - 234.
Hirata Y, Geometrical Acoustics for rectangular rooms, Acustica 43
(1979)2,
247 - 252.
Hirata Y, Dependence of the curvature of sound decay curves and
absorption distribution on room shapes, J. Sound Vibr. 84(1982)
4, 509 - 517.
Mourjopoulos J, On the variation and inveribility of room impulse
response
functions, J. Sound Vibr. 102(1985)2, 217 - 228.
Tohyama M, Equivalent sound absorption area in a rectangular
reverberant
room (Sabine's sound absorption factor), J. Sound Vibr. 108(1986)2,
339 - 343.
Arau-Puchades H, An improved **reverberation** formula, Acustica
65(1988)1, 163 - 180.
Hodgson M R, Predicting frequency varying fitting density and
absorption
coefficient in industrial workrooms, Inter-Noise 96 Proc. 687 - 690.
Mastracco J M, Snek H J, The role of the microphone in the
measurement
of **reverberation**: An application of the scientic methods - I, Acustica
83(1997)2, 284 - 296.
Bistafa S R, Bradley J S, Predicting **reverberation** times in a
simulated
classroom, J. Acoust. Soc. Am., 108(2000)4, 1721 - 1731.
Balachandran C G, Pich change during **reverberation** decay,
(Leters to the editor), J. Sound Vibr. 48(1976) 4, 559 - 560.
Rudowski L, Ozimek E, Linear and sinusoidal frequency changes of
signals in a room, Acustica 83(1997)5, 881 - 890.

best regards

Kari Pesonen

--
E-mail: Kari.Peso...@hut.fi
On sauna hours: Kari.Peso...@sauna.cs.hut.fi

"Higini **Arau** Puchades" <h.a...@terra.es> wrote in message
news:beec2401.0201011750.2e7897cf@posting.google.com...

- Mostrar texto de la cita -

Responder al autor Reenviar

Fin de los mensajes

« Volver a "Debates" « Tema más reciente Tema anterior »

alt.sci.physics.acoustics

RT prediction in rooms with non-equally distributed absorption

Opciones

22 mensajes - Ampliar todos

Alain Bradette Ver perfil   Más opciones 25 ago 2004, 12:43

Hello,

I often have to predict **reverberation** time in rooms like classrooms, gym, open offices and so on. I use Sabin's formula though I know it's wrong but it's simple to use and it's not a catastrophy if the results aren't exactly as predicted. BUT, I'd like to do better by using a more precise formula.

I had a check over the net and found many things. Among them, the Fitzroy's formula modified for 3 axes seems to me the most interesting. There's also a formula from to japanese guys for 2D-RT which looks very interesting in open offices.

But all those things are somewhat theoritical while I'm a consulent engineer and have to "deliver" things that work in the real world. I'd like therefore to hear from you fellows with more experience than me what formula you use in your daily life.

thank you in advance for any help.

Alain Bradette

Responder al autor   Reenviar

Chris Whealy Ver perfil   Más opciones 25 ago 2004, 13:42

Hi Alain

> I often have to predict **reverberation** time in rooms like classrooms,
> gym, open offices and so on. I use Sabin's formula though I know it's
> wrong but it's simple to use and it's not a catastrophy if the results
> aren't exactly as predicted. BUT, I'd like to do better by using a
> more precise formula.

First, let me say that Sabine's formula is fine rooms in which the total average absorption does not exceed about 0.2; I.E. In reverberant rooms.
As the room becomes increasingly absorptive, the numbers produced by
Sabine's formula become increasingly unreliable.

(BTW, Wallace Clement SABINE was the man who is generally credited with
giving architectural acoustics a scientific foundation. A SABIN [no E] is the unit of absorption named in his honour)

Second, it must be clearly understood that all of the RT60 calculations use statistical approximations in order to derive their answers. This means that the sound field is assumed to be diffuse. This is never possible in reality, but the assumption produces answers that do not differ too much from reality.

Therefore, the concept of increasing "accuracy" must be bounded by

the
initial statistical limitations of the formulae. It is better to talk
about "acceptable" values than "accurate" values.

> I had a check over the net and found many things. Among them, the
> Fitzroy's formula modified for 3 axes seems to me the most
> interesting. There's also a formula from to japanese guys for 2D-RT
> which looks very interesting in open offices.

A bit of history...

Norris & Eyring modified Sabine's to make it more applicable to absorptive environments. Norris & Eyring's formula (for some reason Norris' name is often dropped!) uses ln(1-alpha) in the denominator of Sabine's formula instead of the overall absorption.

Fitzroy's then came along and modified Norris & Eyring's formula to account for unequal axial absorption. This formula produces generally acceptable results and is widely used.

Reinhard Neubauer has modified Fitzroy's formulae to account for the "almost 2 dimensional" sound field described by Toyhama et al.
See http://www.ib-neubauer.com/Literatur/ISSEM_99_Gdansk.pdf for details.

Reinhard has also produced some very good papers on the
comparative
merits of the various statistical RT formulae. (See
http://www.ib-neubauer.com/com/tagungen.php for a list of his papers
-
in both English and German).

I have taken all of these RT formulae (and two others due to Higini
Arau
and Millington), and implemented them in a spreadsheet which you
can
download for free from
http://www.rmmpnet.org/members/ChrisW/index.html

There are several acoustic calculation spreadsheets there, but the one that is probably of immediate interest is the Control Room Calculator. This spreadsheet allows you to place up to four different materials on each of the six room surfaces, and calculates the RT60 value (plus a whole load of other values) using various formulae. Please follow read the instructions carefully in order to get the spreadsheet to work properly.

> But all those things are somewhat theoritical while I'm a consulent
> engineer and have to "deliver" things that work in the real world. I'd
> like therefore to hear from you fellows with more experience than me
> what formula you use in your daily life.

With the advent of cheap desktop computers (I.E. in the last 15 years), the drive to find increasingly accurate statistical formulae for RT values has dropped off, and been replaced with software that does 3 dimensional acoustical modelling. See the CATT Acoustic product for
a
good example of such a product (http://www.catt.se).

I would appreciate your feedback on how useful you find my spreadsheets.

Regards

Chris W

--

The voice of ignorance speaks loud and long,
but the words of the wise are quiet and few.
--

Responder al autor Reenviar

Brian Marston Ver perfil Más opciones 25 ago 2004, 15:36

- Mostrar texto de la cita -

Alain,

I personally find the so-called Fitzroy formula reasonably accurate for most
situations with generally good agreement between the pre-measured **reverberation**
times and the calculated **reverberation** times. (It also isn't too tedious on the
calculations).

I've only (just a few minutes ago) finished off a set of calcs for a 400 seat
hall I measured yesterday. Sabine equation calcs didn't even come close to
fitting the measured values but Fitzroy fitted very closely. The hall officially
opens in 4 weeks and they were not impressed with 5 to 6 seconds at 1000Hz. With
luck the new ceiling finish should be in just in time for the opening.

Brian
Consulting Acoustical Engineer
(from Down Under).

Responder al autor Reenviar

Georgios Natsiopoulos Ver perfil Más opciones 25 ago 2004, 23:12

Just an additional comment (or reminder):

Even with the best theory, the reliability of the results are never better
than the accuracy of the input data.

An error analysis (differentials) for Sabine's formula is advisable and
instructive, especially if there are large hard surfaces in the room. Errors
in the absorption coefficient data of +/-5 units of percent are not uncommon
at all.

If you ("you" as in "anyone" of course) can't estimate the error somehow,
you really must admit that you don't know what you are talking about :)

Best regards,
Georgios

"Chris Whealy" <chris.whealy...@SPAMsap.com> skrev i meddelandet
news:cgi1g0$71$1@news1.wdf.sap-ag.de...

- Mostrar texto de la cita -

Responder al autor   Reenviar

Chris Whealy Ver perfil   Más opciones 26 ago 2004, 10:43

Quite so Georgios...

Let me further add that when estimating the RT of an enclosed space with
highly reflective surfaces (say an empty basement room with concrete floor and walls), then the resulting RT value becomes highly sensitive to the initial absorbency conditions.

If you use an absorbency value of say, alpha = 0.01 @ 125Hz, but then
repeat the calculation with alpha = 0.02 @ 125Hz, you could get as much
as a 30% difference in the resulting RT value!

The whole concept of calculating RT values using statistically based formulae can, at best, only give a reasonable suggestion as to the rate of decay of energy in the sound field.

Oh, and I've just remembered one more thing that annoys me about the way
RT values are quoted.

A sound field reverberating in an enclosed space has lower frequency limit, below which the field cannot be considered "diffuse". This frequency in known as the Schroeder frequency, and indicates the point
at which the modal density has become sufficiently low, that individual modes are just starting to become perceptible. The principle here is that the smaller the room volume, the higher the Schroeder frequency.

All the RT formulae derived by Sabine, Norris & Eyring, Fitzroy, **Arau** and Millington etc., are all based on the assumption that the sound field is diffuse. Yet how many times do you see people quoting RT values for control rooms right down to 64Hz, when the room has a Schroeder frequency of say 220Hz! This is gross misuse of the calculations, because the figures they produce are not being used within
the boundaries of accuracy. It appears that not too many people realise
this - hence the proliferation of this error.

If you want to a truly "accurate" value for **reverberation** time, then use a 3D acoustic modelling package. E.G. http://www.catt.se

Regards

Chris W

--
The voice of ignorance speaks loud and long,
but the words of the wise are quiet and few.
--

Responder al autor   Reenviar

Alain Bradette Thank you very much Chris for yoı 26 ago 2004, 12:11

Georgios Natsiopoulos Ver perfil   Más opciones 26 ago 2004, 12:32

I agree.

Note that the 3D modelling programs (CATT and Odeon at least) use small
variations of ray tracing algorithms as engines and also have their

severe
limitations when it comes to relatively small rooms and low frequencies
-
control rooms for example.

In order to take scattering and other effects into account properly, the algorithm should be based on the wave equation itself, or an acceptable
approximation of it (not the ray tracing approx. which is too crude for some
room acoustic purposes).

Georgios
"Go ahead and faith will come to you" (d'Alembert)

"Chris Whealy" <chris.whealy...@SPAMsap.com> skrev i meddelandet
news:cgkbb6hdr1@news1.wdf.sap-ag.de...

- Mostrar texto de la cita -

Responder al autor   Reenviar

Chris Whealy Hi Alain > http://sound.eti.pg.gda.pl 26 ago 2004, 14:31

Higini Arau Puchades Ver perfil   Más opciones 27 ago 2004, 01:20

- Mostrar texto de la cita -

Dear friends of this discussion and special for Chris Whealy by his efforts realised about this sense with his software.

It is known that the classical mean free path obeys a normal (or gaussian law), because it only makes sense when a diffuse sound field
exists, that is to say when one has an uniform disposition of the absorption in the enclosure.
We know, [2], [3], that the absorption exponent, a, is proportional to the sound decay rate, D, produced by the sound reflected after that the sound collision has been produced above each one wall of the room.
When the absorption is constant implies that D is ever constant. When the decay or the absorption is almost constant, with little differences among them, then the arithmetical weighted mean by the area fraction is a good predictor of the behaviour of the sound in the enclosure. This arithmetical mean predictor is characteristic of the symmetrical curves, such is so the Gauss bell curve.
Therefore we have that the classical mean free path and the arithmetical mean treatment of the absorption coefficients are of equivalent nature. Although the sequential and simultaneous reflections against walls are produced, as these surfaces have a similar properties of absorption, then the final result are independent of the type of sound collision that be produced. So we have that all absorption exponents of Sabine, Eyring, Millington and Cremer, only can be applied when we have a constant, or almost constant, absorption distribution, then the arithmetical weighted mean by the area fraction in all the cases, is:
a= (1/S) sum alfai Si , i = 1 to 6, being S = sum Si
being for each case: alfai = alfa is for Sabine;
a = alfaEyr = - ln (1- alfa), where is alfa= (1/S) sum alfai Si for Eyring;
ai = alfai Mil = - ln (1- alfai) for Millington;
alfai = alfaiCre = - ln (1- (1/Si)sum alfaj Sj), being Si = sum Sj ,for Cremer;
Fitzroy formula: is an only experimental formula
By another hand, it is easily derived that the exponent absorption proposed by Fitzroy is an harmonic weighted mean given by the following expression:
aFitz = (1/ax (Sx / S) +1/ay (Sy / S) + 1/az (Sz / S)) -1

where are: ax = - ln (1- alfax)
ay = - ln (1- alfay)
az = - ln (1- alfaz) , being alfax, alfay, alfaz the mean absorption coefficients of areas Sx, Sy, Sz.
In this case the sequentially of the reflections is assured through the arithmetic mean of absorption coefficients between each pair of parallel boundaries. But the harmonic weighted mean of the partial absorption exponents is not good predictor to obtain the mean true of the sample of values, because the mean absorption exponent wished can
not depend of the reciprocal of the partial absorption exponents defined. This is a bad mean by two reasons.
1)Because it means that it does not response to true nature of case, in that increasing anyone of the partial absorption exponents it produces an increasing of the mean value.
2)This mean is strongly incompatible with the normal law of the classical mean free path.

H.**Arau** -Puchades Formula
In this case solving my equation (31), [3], was replaced ai by log ai; it is usual in statistical to obtain a logarithm-normal distribution of the sample. When the values of sample are few, and very unequal, it
is good interchange the true values by their logarithm, [4], because the highest, or smallest, values affect less to the geometrical mean than the arithmetical mean. Moreover this mean is used when the variation of values correspond to equal intervals of time, and I remember that in reality in this case, for non uniform absorption distribution, the different decay rates produced are compared.
By another hand, this geometrical weighted mean is compatible with the
normal law of the classical mean free path, because the sample of values of ai, or Di, have acquired a normal statistical tendency.
Moreover with this mean is assured the simultaneously of the sound reflections above perpendicular walls, while than the sequentiality is assured through the arithmetic mean of the absorption coefficients between each pair of parallel surfaces.
Using this logarithm-normal distribution it has been possible to define a factor of dispersion, d, that enables us to calculate the first **reverberation** time portion, or EDT.
Therefore: Sabine, Eyring, Millington, Cremer, kuttruff, (perhaps Fitzroy also) formulae are only valid for diffuse cases. But **Arau** formula never.

Now I realise here a comparison among calculated from several theories
and measured by S.Bistafa-J.Bradley (*), omitting to expose the Millington RT by very bad results derived, writing the real values obtained by application the Cremer expression (without D),and with D appling the Dance and Shield correction (1) that transforms the Cremer
expression near to Sabine expression.
Also I expose in certain cases CATT calculations in where we need to add diffusion to get aproach the results derived to measured values.

(*): Predicting **reverberation** times in simulated classrooms. J.Acoust. Soc. Am. Vol 108 nº4 (2000).

1.The alfa-values were obtained using the Eyring formula and the **reverberation** times presented for the case 0:

	125	250	500	1000	2000	4000
alfa	0,023	0,026	0,0245	0,027	0,031	0,034

2.The m-values used were:

	125	250	500	1000	2000	4000
m	0,00002	0,00006	0,0002	0,0006	0,002	0,006

The name of each case is given by Bistafa-Bradley

CASE 0

RT	125	250	500	1000	2000	4000
Measured	5,75	5	5,25	4,6	3,5	2,4
Sabine	5,793	5,088	5,297	4,598	3,543	2,475
Eyring	5,727	5,022	5,234	4,54	3,497	2,448
Cremer	5,727	5,022	5,234	4,54	3,497	2,448
Cremer-D	5,793	5,088	5,297	4,598	3,543	2,475
Kuttruff	5,753	5,048	5,259	4,563	3,516	2,459
Fitzroy	5,727	5,022	5,234	4,54	3,497	2,448
Arau	5,727	5,022	5,234	4,54	3,497	2,448

CASE 25

RT	125	250	500	1000	2000	4000
Measured	5,4	2,7	1,55	1,3	1,3	1,25
Sabine	5,033	2,591	1,646	1,368	1,37	1,367
Eyring	4,966	2,524	1,579	1,302	1,311	1,324
Cremer	4,962	2,467	1,462	1,178	1,215	1,273
Cremer-D	5,047	2,786	2,052	1,795	1,683	1,526
Kuttruff	4,921	2,389	1,429	1,166	1,197	1,249
Fitzroy	5,066	3,429	3,218	2,805	2,318	1,829
Arau	5,015	2,942	2,258	1,914	1,747	1,56

CASE 50

RT	125	250	500	1000	2000	4000
Measured	4,55	2,1	1,1	1,1	1,05	1
Sabine	4,449	1,738	0,974	0,803	0,849	0,944
Eyring	4,382	1,671	0,907	0,736	0,786	0,893
Cremer	4,37	1,565	0,728	0,543	0,624	0,789
Cremer-D	4,463	1,859	1,18	1,021	1,027	1,054
Kuttruff	4,362	1,599	0,818	0,648	0,71	0,84
Fitzroy	4,665	3,119	3,028	2,654	2,181	1,717
Arau	4,521	2,284	1,652	1,389	1,309	1,248

CASE 75

RT	125	250	500	1000	2000	4000
Measured	3,7	1,55	1,1	1,3	1,1	1
Sabine	3,985	1,306	0,691	0,568	0,614	0,72
Eyring	3,918	1,239	0,623	0,499	0,549	0,665
Cremer	3,896	1,099	0,395	0,228	0,327	0,516
Cremer-D	3,993	1,354	0,767	0,65	0,684	0,767
Kuttruff	3,951	1,214	0,563	0,434	0,494	0,63
Fitzroy	4,395	2,987	2,956	2,596	2,127	1,67
Arau	4,149	1,922	1,337	1,11	1,069	1,063

CASE 100

RT	125	250	500	1000	2000	4000
Measured	3,4	1,35	1,2	1,4	1,1	1
Sabine	3,698	1,102	0,568	0,466	0,51	0,612
Eyring	3,631	1,034	0,499	0,397	0,443	0,555
Cremer	3,6	0,874	0,215	0	0,111	0,372
Cremer-D	3,698	1,106	0,574	0,472	0,515	0,616
Kuttruff	3,703	1,031	0,451	0,34	0,396	0,529
Fitzroy	4,246	2,93	2,925	2,572	2,103	1,649
Arau	3,926	1,736	1,174	0,962	0,941	0,963
Catt 0% scat						
T15	5,6	4,35	3,98	3,49	2,68	1,81
T30	6,85	5,46	3,88	3,16	3,01	2,16
Catt 10% scat						
T15	3,76	1,51	1,33	1,2	1,08	0,96
T30	3,77	1,56	1,48	1,38	1,25	1,05

CASE HR

RT	125	250	500	1000	2000	4000
Measured	4	2,1	1,35	1,35	1,2	1,1
Sabine	4,449	1,738	0,974	0,803	0,849	0,944
Eyring	4,382	1,671	0,907	0,736	0,786	0,893
Cremer	4,37	1,565	0,728	0,543	0,624	0,789
Cremer-D	4,463	1,859	1,18	1,021	1,027	1,054

Kuttruff	4,362	1,599	0,818	0,648	0,71	0,84
Fitzroy	4,665	3,119	3,028	2,654	2,181	1,717
Arau	4,521	2,284	1,652	1,389	1,309	1,248

CASE HS

	125	250	500	1000	2000	4000
Measured	4,2	2,05	1,5	1,5	1,3	1,1
Sabine	4,449	1,738	0,974	0,803	0,849	0,944
Eyring	4,382	1,671	0,907	0,736	0,786	0,893
Cremer	4,37	1,565	0,728	0,543	0,624	0,789
Cremer-D	4,463	1,859	1,18	1,021	1,027	1,054
Kuttruff	4,362	1,599	0,818	0,648	0,71	0,84
Fitzroy	4,665	3,119	3,028	2,654	2,181	1,717
Arau	4,521	2,284	1,652	1,389	1,309	1,248
Catt scat 0%						
T15	3,89	3,32	3,32	3,3	2,6	2,35
T30	4,58	3,9	3,73	3,29	2,71	2,08
Catt scat 10%						
T15	3,36	1,93	2,02	2,08	2,02	1,92
T30	3,54	1,86	1,64	1,63	1,56	1,45

CASE EW

RT	125	250	500	1000	2000	4000
Measured	4,65	2,15	1,8	1,6	1,45	1,15
Sabine	4,449	1,738	0,974	0,803	0,849	0,944
Eyring	4,382	1,671	0,907	0,736	0,786	0,893
Cremer	4,362	1,475	0,432	0	0	0,663
Cremer-D	4,456	1,788	1,045	0,873	0,909	0,986
Kuttruff	4,303	1,552	0,802	0,64	0,698	0,822
Fitzroy	4,757	2,979	2,586	2,24	1,929	1,616
Arau	4,588	2,343	1,61	1,336	1,292	1,262
Catt scat 0%						
T15	4,64	2,55	2,1	1,83	1,59	1,24
T30	4,85	3,4	3,11	2,66	2,1	1,53
Catt scat 10%						
T15	4,39	1,68	1,01	1,03	0,98	0,93
T30	4,37	1,71	1,07	1,03	1	0,94

CASE PW

RT	125	250	500	1000	2000	4000
Measured	3,9	1,8	1,1	1,1	1,1	1
Sabine	4,449	1,738	0,974	0,803	0,849	0,944
Eyring	4,382	1,671	0,907	0,736	0,786	0,893
Cremer	4,379	1,644	0,864	0,692	0,748	0,868
Cremer-D	4,472	1,925	1,284	1,126	1,113	1,109
Kuttruff	4,279	1,541	0,807	0,65	0,704	0,823
Fitzroy	4,608	2,898	2,732	2,392	1,994	1,61
Arau	4,491					

...

leer más »

Responder al autor   Reenviar

Angelo Campanella Georgios Natsiopoulos wrote 27 ago 2004, 05:27

Angelo Campanella Chris Whealy wrote: > Hi Ala 27 ago 2004, 05:40

Georgios Natsiopoulos Thank you for your answ 27 ago 2004, 07:57

Chris Whealy Ver perfil   Más opciones 27 ago 2004, 11:49

Higini **Arau** Puchades wrote:
> Dear friends of this discussion and special for Chris Whealy by his
> efforts realised about this sense with his software.

Señor **Arau**-Puchades! Thank you for your lengthy reply! I will certainly
study it in detail when I have the time.

Regards

Chris W

--
The voice of ignorance speaks loud and long,
but the words of the wise are quiet and few.
--

Responder al autor Reenviar

Angelo Campanella Georgios Natsiopoulos wrote 28 ago 2004, 03:39
Brian Marston Chris Whealy wrote: > Hi Alain <Sl 28 ago 2004, 23:43
Chris Whealy Hi Brian > Yes, it sound horrible ! > 29 ago 2004, 21:25
Georgios Natsiopoulos Ver perfil Más opciones 30 ago 2004, 10:13

I have done error analyses, but just for Sabines formula in acoustics.
It wouldn't be much more difficult to do it for the other variations
of the **reverberation** formulae.

I read the Fitzroy article some year ago and found it interesting and
easy to use, at least for rectangular rooms.

Error analyses may be replaced or at least augmented by the less
quantitative tools of common sense based on experience, even if it
less elegant in my opinion. But who cares as long as the result is
good enough to get away with it, right? :)

Well I do care, but ok, it is mostly for egoistic/aesthetical reasons:
To strive for perfection - wouldn't be fun or interesting otherwise.
After all, most mistakes can be corrected afterwards if necessary -
the question is who pays.

Georgios Natsiopoulos

"Beware of the man who works hard to learn something, learns it, and
finds himself no wiser than before. He is full of murderous resentment
of people who are ignorant without having come by their ignorance the
hard way."
-- Bokonon

- Mostrar texto de la cita -

Responder al autor Reenviar

Angelo Campanella Ver perfil Más opciones 30 ago 2004, 16:12

Georgios Natsiopoulos wrote:
> I have done error analyses, but just for Sabines formula in acoustics.
> It wouldn't be much more difficult to do it for the other variations
> of the **reverberation** formulae.

What have you used for input data?

Consider this:

For a variety of room arrangements, but of the same volume, and with
the
same area of sound absorbing material, and the same material, a
wide
variety of **reverberation** times result, sometimes as much as a factor
of
two. Now, to which factor in the Sabine relation do you attribute he
error?

Angelo Campanella

Responder al autor Reenviar

Angelo Campanella	Georgios Natsiopoulos wrote	30 ago 2004, 21:44
Georgios Natsiopoulos	Ok, point taken. With nor	31 ago 2004, 07:30
Georgios Natsiopoulos	Small addition and clarifi	31 ago 2004, 14:01
Georgios Natsiopoulos	----- Original Message -----	4 sep 2004, 19:40

Fin de los mensajes

« Volver a "Debates" « Tema más reciente Tema anterior »

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alt.sci.physics.acoustics

RT60 calculation (Long message) from 05 Nov to 09 Nov Some Remarks

Higini Arau Puchades Ver perfil Más opciones 1 ene 2002, 16:18

Dear AME, Yin Woon Pin, Noral D.Stwart, Eric Desart, Bill Davies, Gary
Sokolich.

I have delayed to the feast. Happy new year¡

I am pleased in contact with you to explain as my formula must applied. And perhaps I explain as must be used Fitzroy formula. However I do not Knew how Fitzroy thought , I believe equall to Sabine.

Working with my formula is required that we think in different form that the Sabine, or Eyring, formulae are used.
1. In a rectangular room we have none problem, Sabine, Eyring, Fitzroy
and **Arau** formulae are applied of same form, because the real area of main surfaces are coincidental with the projected areas.
But when we have, for example a hall with a sloped floor, then Sabine, Eyring, formulae considers this surface contained only in one main surface, for example the real floor. However for **Arau** formula ever must be realised a decomposition of the area in projected areas above each direction.
I look the room, appliying my formula, in sections as the architectural plans observe the room.
Then these projected areas must be added in your corresponding direction and also had in account as absorption in each direction.
Therefore the projected areas be are added as real surfaces added them
and also had in accounting as absorption surfaces.
The same form must be operated in any other direction that it happens.

2. If several surfaces are producing a relief, or prominence, above a main surface, they must be account as producing absorption units but not be considered as increasing the geometrical area of its main surfaces.

3. If a material is placed in strips above a main surface then diffraction or edge effect increases its absorption, and therefore these absorption coefficients must be increased according one law developed by Ten Wolde[1]:
alfastrip = alfatest ASTM + betaE, we obtain the following values of beta by frequencies,
[1] T. Ten Wolde (1967) Measurement on the Edge-Effect in **Reverberation** Rooms. Acustica. Vol.18 pp.207-212.
By other hand I give data of RT60 calculated for a room of 8 m x 8 m x 8 m, where the absorption 0.8 is placed in the ceiling and 0.02 absorption is placed in walls.

TR Fitzroy	7.264
TR **Arau**	3.604
TR Sabine	1.440

TR Eyring 1.329
However the same results are obtained if 0.80 is placed in a one wall with 0.02 is ubicated in remaining surfaces. The Fitzroy RT60 is highest.

Sincerely yours
Higini

Responder al autor Reenviar

Desart Eric Ver perfil Más opciones 1 ene 2002, 18:18

Hello Higini

Most welcome here

Just a question:
You use the projected area rather than the real surface.
How do you count then for the alpha value to be used? If I assume that you use
the total absorption available on the real surface divided by the projected
surface, to obtain a new alpha value? Is that correct?

It's in fact a bit the way I use mostly for the Eyring approach, and Sabine
where surfaces are used (mostly only calculating with V)? I never saw it
explicit described, but interpreted it more as acoustic boundaries (depending on
mood and circumstances).

Still have to find a copy of the
[1] T. Ten Wolde (1967) Measurement on the Edge-Effect in
| **Reverberation** Rooms. Acustica. Vol.18 pp.207-212.

Kind regards

Eric

"Higini **Arau** Puchades" <h.a...@terra.es> schreef in bericht
news:beec2401.0201010718.597831ab@posting.google.com...
| Dear AME, Yin Woon Pin, Noral D.Stwart, Eric Desart, Bill Davies, Gary
| Sokolich.
|
| I have delayed to the feast. Happy new year¡
|
| I am pleased in contact with you to explain as my formula must
| applied. And perhaps I explain as must be used Fitzroy formula.
| However I do not Knew how Fitzroy thought , I believe equall to
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| highest.
|
|
| Sincerely yours
| Higini

Responder al autor Reenviar

Kari Pesonen Ver perfil Más opciones 1 ene 2002, 19:20

- Mostrar texto de la cita -

.. snip...
Another (of the many edge effect) source(s), perhaps easier
accessible
Bartel T W, Effect of absorber geometry on apparent absorption
coefficients
as measured in a **reverberation** chamber, J. Acoust. Soc. Am. 69
(1981)4
1065 -1074.
Have also a look at the list of references.

all the best for the year 2002

Kari Pesonen

--
E-mail: Kari.Peso...@hut.fi
On sauna hours: Kari.Peso...@sauna.cs.hut.fi

Responder al autor Reenviar

Higini Arau Puchades Ver perfil Más opciones

Hello Desart and Karin,

For me is a pleasure to meet with you.

Desart is christian name as Higini or it is Eric? For me it is very difficult because ever fail in this question.

The question formulated by you is complicated, and perhaps never will be solved.
In rectangular rooms we must accept that area real is the same than projected. It is coincidental. In this case we have not problem.
However we can imagine now we have a hall, for example with a floor very sloped, in where the real bottom wall is very small, almoast negligible, we assume be zero. What is in this case the bottom rear wall? For me it is the projected floor as is obsrved in a transversal section of the hall. And this case I multiply the absorption coeficient by the projected area to x and z direcctions: alfa x Sx = alfa x S cos beta and alfa x Sz = alfa x S sin beta.
, being beta the angle formed by audience plane with the horizontal and A the real floor area. The sound incidence angle Theta = 90 - beta.
We know that the power absorbed by a boundary surface S change with the angle of incidence. Therefore we have that the absorbed power decreases because the surface intercepts only the projected area S cos theta on the incident wave. By another hand we have also that the absorption coefficient alfa depends on angle of incidence according alfa theta = alfa 0 / cos theta, where alfa o is the absorption coefficient for perpendicular incidence. Writing the projected areas in function the incidence angle theta and finding the absorption units in each direction, having this angle variation of the absorption, we have:
Ax = (alfa o/ cos theta)x S sin theta = S alfa 0 tan theta
Az = (alfa 0 / cos theta) x S cos theta = S alfa 0
Knowing that the coefficient absorption has its maximum value for normal incidence, and being normally the angle theta, with relation to sloped floor, will be an angle less to 45º, I look then that the mistake produced will be small.

In relation to Kari, I know that the Bartel paper. With edge effect I wish to express the absorption increasing produced by edge when the material is placed on strips.

I go to sleep. My wishes for the year 2002. Goodby. Higini

- Mostrar texto de la cita -

Responder al autor Reenviar

Angelo Campanella Ver perfil Más opciones 2 ene 2002, 07:14

Desart Eric wrote:
> It's in fact a bit the way I use mostly for the Eyring approach, and Sabine
> where surfaces are used (mostly only calculating with V)? I never saw it
> explicit described, but interpreted it more as acoustic boundaries (depending on
> mood and circumstances).

Some years ago, after an exhaustive search and study to explain the "edge
effect" and alpha'a greater than 1.0 for 72 sq.ft. specimens (per ASTM C423), I concluded that representations of the **reverberation** time are

but approximations convenient to the situation. Two clear instances plus
an important fact arise:

1- Little room absorption, characteristic of **reverberation** room testing.

2- Much (major) room absorption; studios, outdoors, stadiums. Here the
use of the "test results" from 1- are misleading since absorption areas in sabines can exceed the actual wall surface sabine area! Clearly this is an anomaly of mathematics being applied outside the range of its validity. The overall phenomenon of sound absorption in a closed room
is a 3-dimensional phenomenon. No single - or even a small number of -
scalar or one-dimensional mathematical relations is or are going to properly represent RT any more than in radio, one-dimensional transmission line theory could explain the impedance and pattern behavior of antennas.

3- Whereas common **reverberation** mathematics is oblivious to wavelength
effects, sound wave scattering and absorption are very much sensitive to
said effects. It is quite likely that one of your formulations fairly represents low frequency sound behavior, but it will also fall short of representing the absorption of high frequency sound. This is especially evident above 2,000 Hz.

So, folks, knock yourself out in your search for the Holy Grail of RT60
prediction. I use a series of approximations and "constants" accumulated
over decades of RT manipulation to the content of architects, and building owners.

When you have had your fill of such Odysseys, build your own library of
"factors" based on real world experience accumulated to date.

Cheers,

Angelo Campanella.

--
--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor   Reenviar

Angelo Campanella Ver perfil   Más opciones 2 ene 2002, 07:19

Kari Pesonen wrote:
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> Bartel T W, Effect of absorber geometry on apparent absorption coefficients
> as measured in a **reverberation** chamber, J. Acoust. Soc. Am. 69(1981)4
> 1065 -1074.

You will note that Bartel cut off his data below 250 Hz, since the "diffuse" conditions and wavelengths equal to or smaller than the size of the test specimens did not exist at lower frequencies (my explanation. This is not any help at 125, 63 Hz where a lot of noise reduction problems remain confronting us.

Cheers,
Angelo Campanella

--------- www.CampanellaAcoustics.com ---------
------ a.campane...@worldnet.att.net ------
"I have simply studied carefully whatever I've undertaken, and tried to hold a reserve that would carry me through." - Charles A. Lindbergh.

Responder al autor Reenviar

Desart Eric Ver perfil Más opciones 2 ene 2002, 09:39

Hi Angelo

Accept your comments completely.
It remains difficult and experience is an extremely important factor.
Sabine is indeed only valid for highly reverberant fields, and his linear approach leads to those mathematical impossibilities.

Still I never studied (years ago) the 'Aura Puchades' formula, you once told me
that you often use the Fitzroy approach (which I also didn't know), the differences as you can see them in the example Higini calculated, are significant.
It's useful for me to understand and feel the theoretical approaches.
How, when
and where to apply them, which doesn't make insight and experience less
important.

Eric

"Angelo Campanella" <a.campane...@worldnet.att.net> schreef in bericht
news:3C32A545.50703@worldnet.att.net...
| Desart Eric wrote:

|
|
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| is an anomaly of mathematics being applied outside the range of its
| validity. The overall phenomenon of sound absorption in a closed room

| is a 3-dimensional phenomenon. No single - or even a small number of -
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| behavior of antennas.
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| So, folks, knock yourself out in your search for the Holy Grail of RT60
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|
| When you have had your fill of such Odysseys, build your own library of
| "factors" based on real world experience accumulated to date.
|
| Cheers,
|
| Angelo Campanella.
| --
| --------- www.CampanellaAcoustics.com ---------
| ------ a.campane...@worldnet.att.net ------
| "I have simply studied carefully whatever I've undertaken, and tried to
| hold a reserve that would carry me through." - Charles A. Lindbergh.
|

Responder al autor   Reenviar

Desart Eric Ver perfil   Más opciones

Thanks Higini

Must think about your explanation.

By the way, my first name is Eric (Norwegian from origin I'm told). Just by a stupid Email address problems in the beginning, where the 'Eric Desart' vers failed to work I got it reversed. Since it is a common practice here in official documents in Belgium to put the Family name first (as such not wrong I just left it that way (bit lazy from me, just happy it worked).

Eric

PS: the link you gave in the silencers message should be:
http://www.librenie.com.co/ instead of :
http://www.librerie.com.co/
Speak (a bit) a few languages but Spanish isn't one of them.

"Higini **Arau** Puchades" <h.a...@terra.es> schreef in bericht
news:beec2401.0201011750.2e7897cf@posting.google.com...
| Hello Desart and Karin,
|
| For me is a pleasure to meet with you.
|
| Desart is christian name as Higini or it is Eric? For me it is very
| difficult because ever fail in this question.
|
| The question formulated by you is complicated, and perhaps never will
| be solved.
| In rectangular rooms we must accept that area real is the same than
| projected. It is coincidental. In this case we have not problem.

| However we can imagine now we have a hall, for example with a floor
| very sloped, in where the real bottom wall is very small, almoast
| negligible, we assume be zero. What is in this case the bottom rear
| wall? For me it is the projected floor as is obsrved in a transversal
| section of the hall. And this case I multiply the absorption
| coeficient by the projected area to x and z direcctions: alfa x Sx =
| alfa x S cos beta and alfa x Sz = alfa x S sin beta.
| , being beta the angle formed by audience plane with the horizontal
| and A the real floor area. The sound incidence angle Theta = 90 -
| beta.
| We know that the power absorbed by a boundary surface S change with
| the angle of incidence. Therefore we have that the absorbed power
| decreases because the surface intercepts only the projected area S cos
| theta on the incident wave. By another hand we have also that the
| absorption coefficient alfa depends on angle of incidence according
| alfa theta = alfa 0 / cos theta, where alfa o is the absorption
| coefficient for perpendicular incidence. Writing the projected areas
| in function the incidence angle theta and finding the absorption units
| in each direction, having this angle variation of the absorption, we
| have:
| Ax = (alfa o/ cos theta)x S sin theta = S alfa 0 tan theta
| Az = (alfa 0 / cos theta) x S cos theta = S alfa 0
| Knowing that the coefficient absorption has its maximum value for
| normal incidence, and being normally the angle theta, with relation to
| sloped floor, will be an angle less to 45º, I look then that the
| mistake produced will be small.
|
| In relation to Kari, I know that the Bartel paper. With edge effect I
| wish to express the absorption increasing produced by edge when the
| material is placed on strips.
|
| I go to sleep. My wishes for the year 2002. Goodby. Higini
|
|

| "Kari Pesonen" <Kari.Pesonen@no_spam.welho.com> wrote in message
<news:a0sua8kvt1@nyytiset.pp.htv.fi>...
| > "Desart Eric" <af...@belgacom.net> wrote in message
news:3c31ef77$0$33498$ba620e4c@news.skynet.be...
| > > Hello Higini
| > >
| > > Most welcome here
| > >
| > > Just a question:
| > > You use the projected area rather than the real surface.
| > > How do you count then for the alpha value to be used? If I assume tha
you use
| > > the total absorption available on the real surface divided by the
projected
| > > surface, to obtain a new alpha value? Is that correct?
| > >
| > > It's in fact a bit the way I use mostly for the Eyring approach, and
Sabine
| > > where surfaces are used (mostly only calculating with V)? I never saw
| > > explicit described, but interpreted it more as acoustic boundaries
(depending on
| > > mood and circumstances).
| > >
| > > Still have to find a copy of the
| > > [1] T. Ten Wolde (1967) Measurement on the Edge-Effect in
| > > **Reverberation** Rooms. Acustica. Vol.18 pp.207-212.
| > .. snip...
| > Another (of the many edge effect) source(s), perhaps easier accessible
| > Bartel T W, Effect of absorber geometry on apparent absorption coefficie
| > as measured in a **reverberation** chamber, J. Acoust. Soc. Am. 69(198
| > 1065 -1074.
| > Have also a look at the list of references.
| >
| > all the best for the year 2002
| >
| > Kari Pesonen

Responder al autor Reenviar

Kari Pesonen Ver perfil Más opciones 2 ene 2002, 11:00

Some interesting papers for those who want to have little more insight
and questions to reververation predictability problems:

Mankovsky V S, Acoustics of studios and auditoria, Focal Press,
1971, 395 p. (e.g., abs.coeff. formulas 3.21 - 3.23)
Gibbs B M, Jones D K, A simple methods for calculating the
distribution
of sound pressure level within an enclosure, Acustica 26(1972)1, 24
- 32.
Mehta M L, Mulholland K A, Effect of non-uniform distribution of
absorption
on **reverberation** time, J. Sound Vibr. 46(1976)2, 209 - 234.
Hirata Y, Geometrical Acoustics for rectangular rooms, Acustica 43
(1979)2,
247 - 252.
Hirata Y, Dependence of the curvature of sound decay curves and
absorption distribution on room shapes, J. Sound Vibr. 84(1982)
4, 509 - 517.
Mourjopoulos J, On the variation and inveribility of room impulse
response
functions, J. Sound Vibr. 102(1985)2, 217 - 228.
Tohyama M, Equivalent sound absorption area in a rectangular
reverberant
room (Sabine's sound absorption factor), J. Sound Vibr. 108(1986)2,
339 - 343.
Arau-Puchades H, An improved **reverberation** formula, Acustica
65(1988)1, 163 - 180.
Hodgson M R, Predicting frequency varying fitting density and
absorption
coefficient in industrial workrooms, Inter-Noise 96 Proc. 687 - 690.
Mastracco J M, Snek H J, The role of the microphone in the
measurement
of **reverberation**: An application of the scientic methods - I, Acustica
83(1997)2, 284 - 296.
Bistafa S R, Bradley J S, Predicting **reverberation** times in a
simulated
classroom, J. Acoust. Soc. Am., 108(2000)4, 1721 - 1731.
Balachandran C G, Pich change during **reverberation** decay,
(Leters to the editor), J. Sound Vibr. 48(1976) 4, 559 - 560.
Rudowski L, Ozimek E, Linear and sinusoidal frequency changes of
signals in a room, Acustica 83(1997)5, 881 - 890.

best regards

Kari Pesonen

--
E-mail: Kari.Peso...@hut.fi
On sauna hours: Kari.Peso...@sauna.cs.hut.fi

"Higini **Arau** Puchades" <h.a...@terra.es> wrote in message
news:beec2401.0201011750.2e7897cf@posting.google.com...

- Mostrar texto de la cita -

Responder al autor Reenviar

Fin de los mensajes

« Volver a "Debates" « Tema más reciente Tema anterior »

alt.sci.physics.acoustics

How can a hall have a short EDT and a long RT60?

Tony Hello, I just finished going through M. Barror 13 ago 2002, 06:43

Higini Arau Puchades Ver perfil Más opciones 19 ago 2002, 23:31

"Tony" <tony...@canada.com> wrote in message
<news:k0169.138082$Ag2.7112216@news2.calgary.shaw.ca>...
> Hello,

> I just finished going through M. Barron's book Auditorium Acoustics &
> Architectural Design, apart from the usual famous halls, Marshall's Christ
> Church, and Segerstrom Hall perked my curiousity (appendix C). It seems like
> the trend in all new high-end concert halls is an occupied midband RT of
> 2-2.2 sec and an EDT of 1.2-1.4 sec. While there seems to be lots of books
> on how to get a room with RT60 time of 2 secs to sound good, I can't find
> any literature on how to get that elusive double slope curve with a EDT of
> almost half the RT60!

> Anyone know the secret?

> Tony

Dear Tony,
The EDT is a consequence of the existence of a non-sound diffuse field. It is dependance of an asymmetrical absorption distribution on the room.
None **reverberation** time theoty treat this subject to exception of An improved **reverberation** formula (H.**Arau**-Puchades. Acustica (1988) Vol
65. p.163- 180).
And by other hand only we have the experiments realised by O'Keefe (
The influence of heigth/width ratio and side wall boxes on room.
Acoustics measurements. Inst. of Acoustics, Manchester, October 1999.), who derived that EDT/RT ratio decrease as a function of the height to width ratio. For heigth to width ratios greater than 1.0,
the EDT/RT ratio is perfectly efficient, or similars. If the height to width ratios les than 1 there is a degradation of the early decay time being possible in ahall with a RT = 2s to obatin an EDT 0.4 s shorter that RT in a low ceiling concert hall.To summarise, in a wide, flat room one can expected the EDT to be much shorter than the RT, EDT/RT
ratios could be in the range of 70 to 80%. Also he investigated the effect of the absorption above EDT. As final conclusion obtained the EDT/RT ratio is shown to be proportional to the Height to width ratio and inversely proportional to average room absorption.
Now we will analyse it from the view point of the H.**Arau** (1988).
In this theory we have: EDT = RT/d, being d the factor dispersion, given in equation (34). Therefore: EDT/RT = 1/d. If d=1 then EDT = RT
and therefore we have sound diffuse field.

The d factor was improved in equation (15) in the paper "General Theory of the Energy Relations in Halls with Asymmetrical Absorption.(1998) Higini **Arau**. Building Acoustics, Vol 5 number 3, p.163-183).
According to theory of H.**Arau** we have the EDT (there indicated Ti)is dependent in main proportion to the absorption distribution on the several surfaces and second therm to the geometrical relations, specially to the heigth/widht ratio.

We assume we have the following cases:
Hall 1: Long 40 m, Witdh = 20 m, Height = 12.5 m
Hall 2: Long 32 m, Witdh = 25 m, Height = 12.5 m
Hall 3: Long 25 m, Witdh = 15 m, Height = 26.66 m
Hall 4: Long 53.33 m, Witdh = 15 m, Height = 12.5 m
Hall 5: Long 50 m, Witdh = 50 m, Height = 8 m.
Hall 6: Long 24.3 m, Witdh = 15 m, Height = 24.3 m.
Hall 7: Long 24.3 m, Witdh = 24.3 m, Height = 15 m.
In all these cases the absorption are: Alfa foor: 0.8, Alfa ceiling: 0.09
alfa walls: 0.09. In these cases we have tried to obtain a mean free path lm similar.
The values calculated, for beta= -2, are:

Case	H/W	L/W	RTSabine	RTArau	d	EDT/RT	lm	alfa mean
1	0.625	2	1.913	2.153	1.257	0.795	12.903	0.273
2	0.5	1.28	1.91	2.12	1.253	0.798	13.22	0.278
3	1.77	1.666	2.939	3.493	1.214	0.823	12.976	0.176
4	0.833	3.555	1.854	2.109	1.254	0.797	12.09	0.262
5	0.16	1	1.358	1.288	1.214	0.823	12.12	0.359
6	1.62	1.62	2.85	3.401	1.224	0.817	13.425	0.188
7	0.6173	1	2.161	2.49	1.252	0.794	13.425	0.249

Analysing these cases we have that:
When the EDT/RT ratio are increasing for high H/W ratio (case 3) or also for very smaller W/H ratio (case 5). In specially the case 6 have a golden proportion related by the fibonacci number. This case is good the EDT/RT ratio is higher. Many old churches of the temple have these
proportions. And also is observed that when be greatest the area of maximum absorption (in thess cases the floor) will be shorter EDT/RT ratio.
What happens when the absorption is varied?
Analyse first the case 6 puting alfa walls = 0.20, alfa ceiling= 0.09, alfa floor= 0.80,(called case 66) and second changing again puting: alfa walls = 0.45, alfa ceiling= 0.09, alfa floor= 0.80 (called case 666).
And also the case 7 puting:alfa walls = 0.20, alfa ceiling= 0.09, alfa floor= 0.80 (called case 77) and second puting: alfa walls = 0.45, alfa ceiling= 0.09, alfa floor= 0.80 (called case 777)

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77	0.6173	1	1.741	1.565	1.127	0.887	13.425	0.310
777	0.6173	1	1.207	0.912	1.002	0.998	13.425	0.448

We see that when the absorption is adequatetely distributed on the surfaces of the hall the the EDT/RT ratio is noticieably improved.
Sincerely yours

Higini

Responder al autor Reenviar

Eric Desart Ver perfil Más opciones 20 ago 2002, 01:54

Hello Higini,

Welcome back

Eric

"Higini **Arau** Puchades" <h.a...@terra.es> schreef in bericht
news:beec2401.0208191431.1338ca19@posting.google.com...
| "Tony" <tony...@canada.com> wrote in message

<news:k0169.138082$Ag2.7112216@news2.calgary.shaw.ca>...

Responder al autor Reenviar

Higini Arau Puchades Ver perfil Más opciones 20 ago 2002, 10:19

"Eric Desart" <af...@belgacom.net> wrote in message
<news:3d6192c5$0$187$ba620e4c@news.skynet.be>...
> Hello Higini,

> Welcome back

> Eric

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> | "Tony" <tony...@canada.com> wrote in message
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Hello Eric,

Other I am here with you. But I go to holidays after a time of very hard job .
Spain is ever of feast, and Catalonia land of Gaudi very enjoy, with very sun, good sea and mountains and prairies very green. Come you someone day with me, you can regard that I say you.
Kind regards

Higini

Responder al autor Reenviar

John O'Keefe Ver perfil Más opciones 13 sep 2002, 22:29

For those who might be interested, here is a link to my paper quoted below:

http://www.aercoustics.com/papers/ioa99/ioa99.htm

I might also note that, although I have chosen to make the correlation between Height/Width Ratio and the EDT/RT ratio, that was only done so
the concept could be easily understood by the rest of the world. For those of us who understand how sound behaves in a room, I could have
just as easily chosen a correlation between the ratio of Seat Absorption/Total Absorption vs H/W ratio. My guess is that the latter of these two alternatives (i.e Sabs/Tabs vs H/W ratio) is probably the more physically robust. This concept was part of the presentation in Manchester but I have not written anything about it yet.

... consider it an alt.sci.physics.acoustics scoop ;-)

John O'Keefe

- Mostrar texto de la cita -

Responder al autor Reenviar

John O'Keefe Ver perfil Más opciones 13 sep 2002, 22:40

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John O'Keefe

- Ocultar texto de la cita -

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Responder al autor Reenviar

Higini Arau Puchades John O'Keefe wrote: > I m 14 sep 2002, 16:08

Fin de los mensajes

« Volver a "Debates" « Tema más reciente Tema anterior »