

Acoustical evaluation of five public spaces in Dubrovnik

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Content

- Introduction
- Investigated spaces
- Measurement results and evaluation
- Conclusions

Introduction

- Dubrovnik = city with great history
- diverse cultural program for visitors → Dubrovnik Summer Festival
- venues = historic spaces of great significance + modern-day buildings
- acoustical suitability of the venues for the foreseen applications
- 5 venues chosen for evaluation
- RT_{60} , EDT , C_{50} , C_{80} , G , LF_E , BQI , STI , $ITDG$ and V/N



Venues - the Rector's Palace

- 13th century
- one of the most significant architectural monuments on Croatian coast
- atrium - classical and chamber music performances
- 300 seats - ground floor and balcony
- total volume = 2900 m³



Venues - Revelin Fortress

- 15th century
- fortification, treasury, municipal headquarters
- terrace - summer theatre
- interior - modern concerts
- volume = 1500 m³
- 220 seats



Venues - Slanica Concert Hall

- a part of Revelin Fortress
- rehearsal space for Dubrovnik Symphony Orchestra
- volume = 685m^3
- 170 seats



Venues - Marin Držić Theatre

- 19th century
- long tradition of theatre performance
- volume = 1640 m³
- 283 seats



Venues - Sloboda Movie Theatre

- modern
- movie screenings
- volume = 1350 m³
- 175 seats



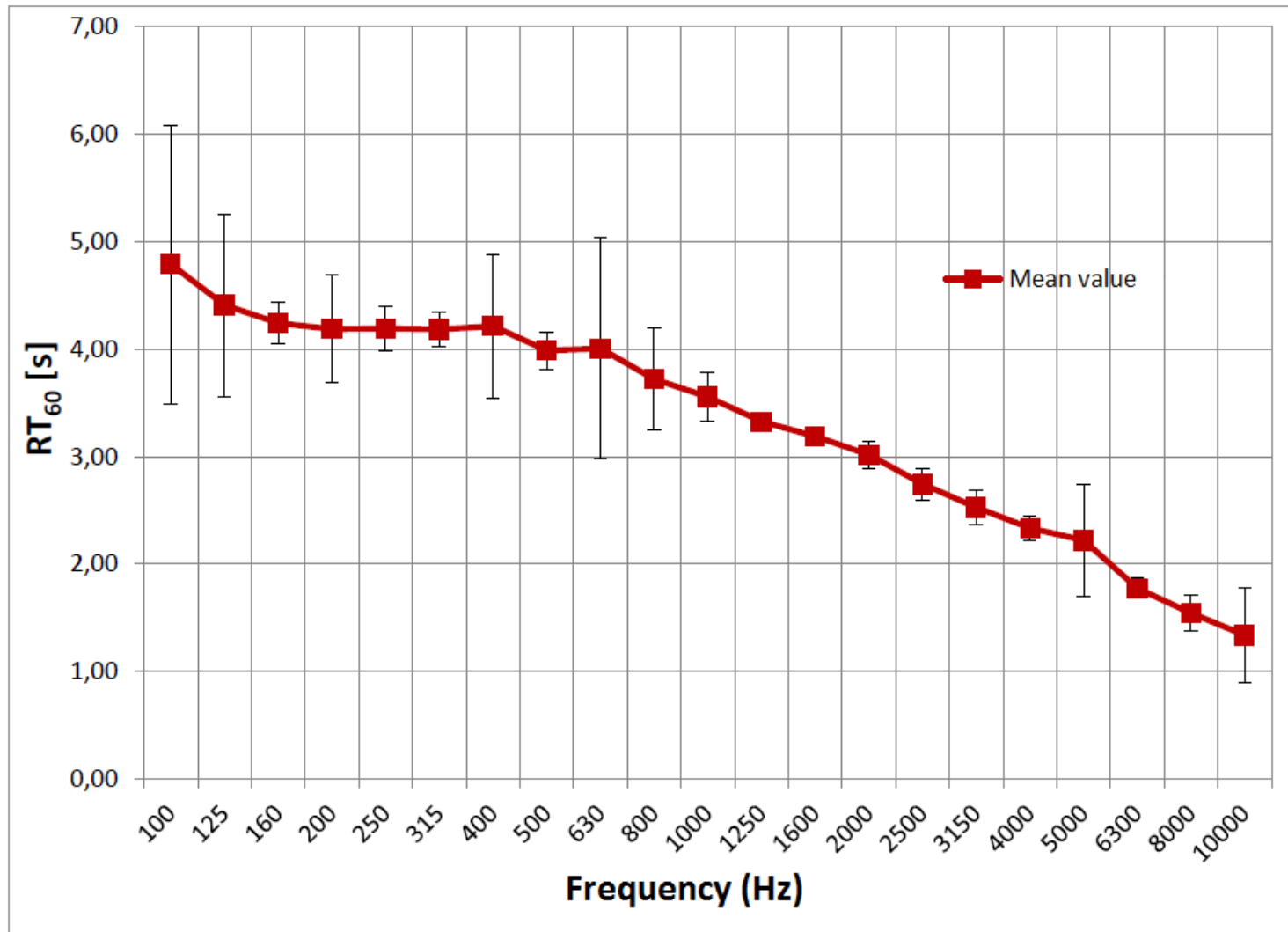
Suitability for primary purpose

	Rector's Palace	Revelin Fortress	Slanica Concert Hall	Marin Držić Theatre	Sloboda Movie Theatre
RT_{60} (s)	3.80	1.34	1.20	0.78	1.06
EDT (s)	3.72	1.30	1.20	0.72	0.94
C_{50} (dB)	-8.1	-1.3	-1.3	2.1	0.1
C_{80} (dB)	-5.5	1.6	1.6	5.9	3.6
G_{mid} (dB)	7.0	0.7	5.7	1.6	4.6
LF_E	0.20	0.10	0.23	0.12	0.13
BQI	0.74	0.63	0.72	0.71	0.75
STI	0.36	0.58	0.56	0.68	0.65
$ITDG$ (ms)	24.50	2.56	3.74	4.20	4.38
$V(m^3)$	2900	1500	685	1640	1350
N	300	220	170	283	175
V/N (m ³ /prs.)	9.7	6.8	4.0	5.8	7.7

The Rector's palace

The Rector's Palace	RT_{60} (s)	EDT (s)	BQI	G_{mid} (dB)	C_{80} (dB)	$ITDG$ (ms)	V/N (m ³ /pers.)	STI
Measured values	3.80	3.72	0.74	7.0	-5.5	24.50	9.7	0.36
Symphonical music								
Chamber music								
Opera								
Speech								
Cinema								

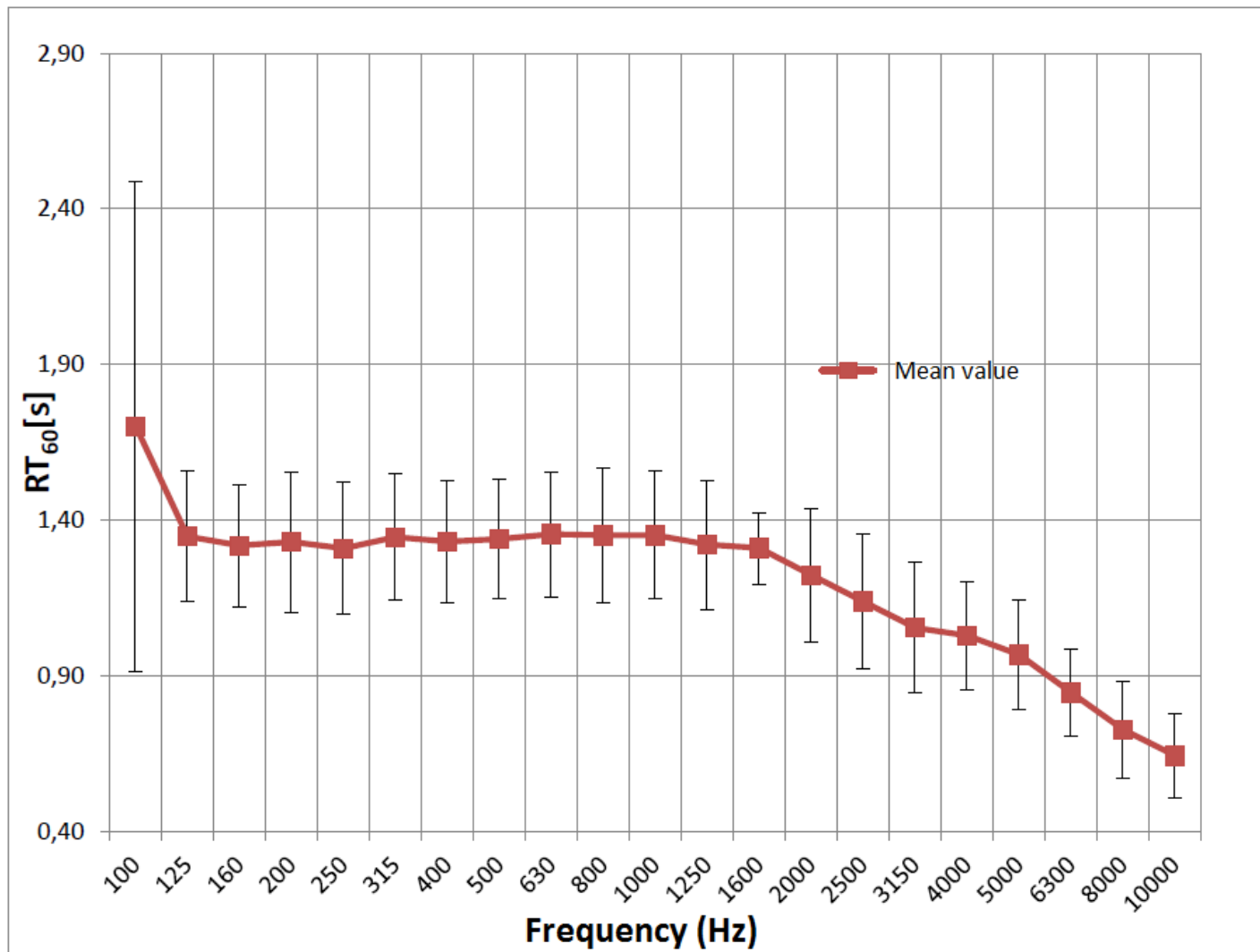
The Rector's palace



Revelin Fortress

Revelin Fortress	RT_{60} (s)	EDT (s)	BQI	G_{mid} (dB)	C_{80} (dB)	$ITDG$ (ms)	V/N (m ³ /pers.)	STI
Measured values	1.34	1.30	0.63	0.7	1.6	2.56	6.8	0.58
Symphonical music								
Chamber music								
Opera								
Speech								
Cinema								

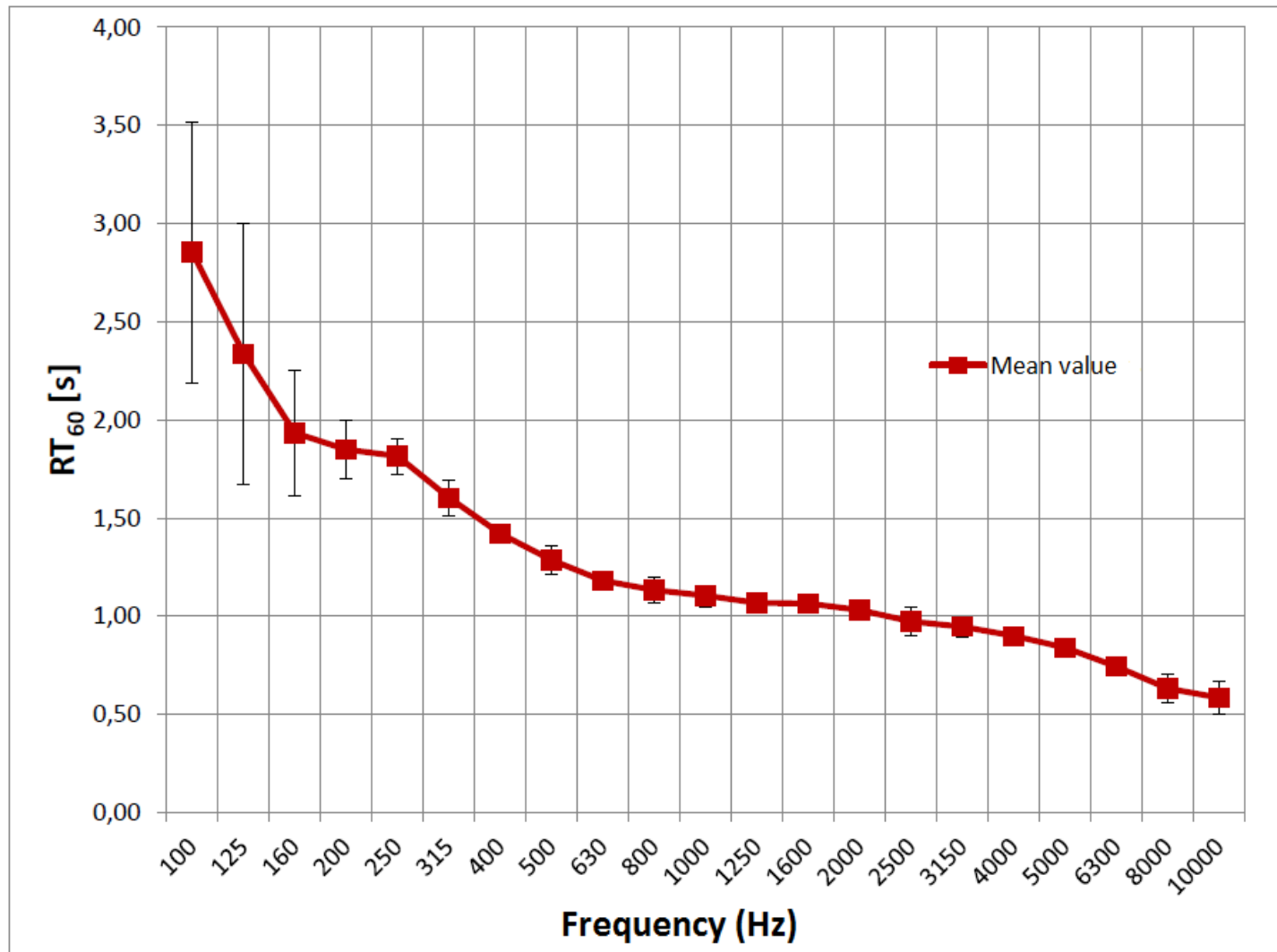
Revelin Fortress



Slanica Concert Hall

Slanica Concert Hall	RT_{60} (s)	EDT (s)	BQI	G_{mid} (dB)	C_{80} (dB)	$ITDG$ (ms)	V/N (m ³ /pers.)	STI
Measured values	1.20	1.20	0.72	5.7	1.6	3.74	4.0	0.56
Symphonical music								
Chamber music								
Opera								
Speech								
Cinema								

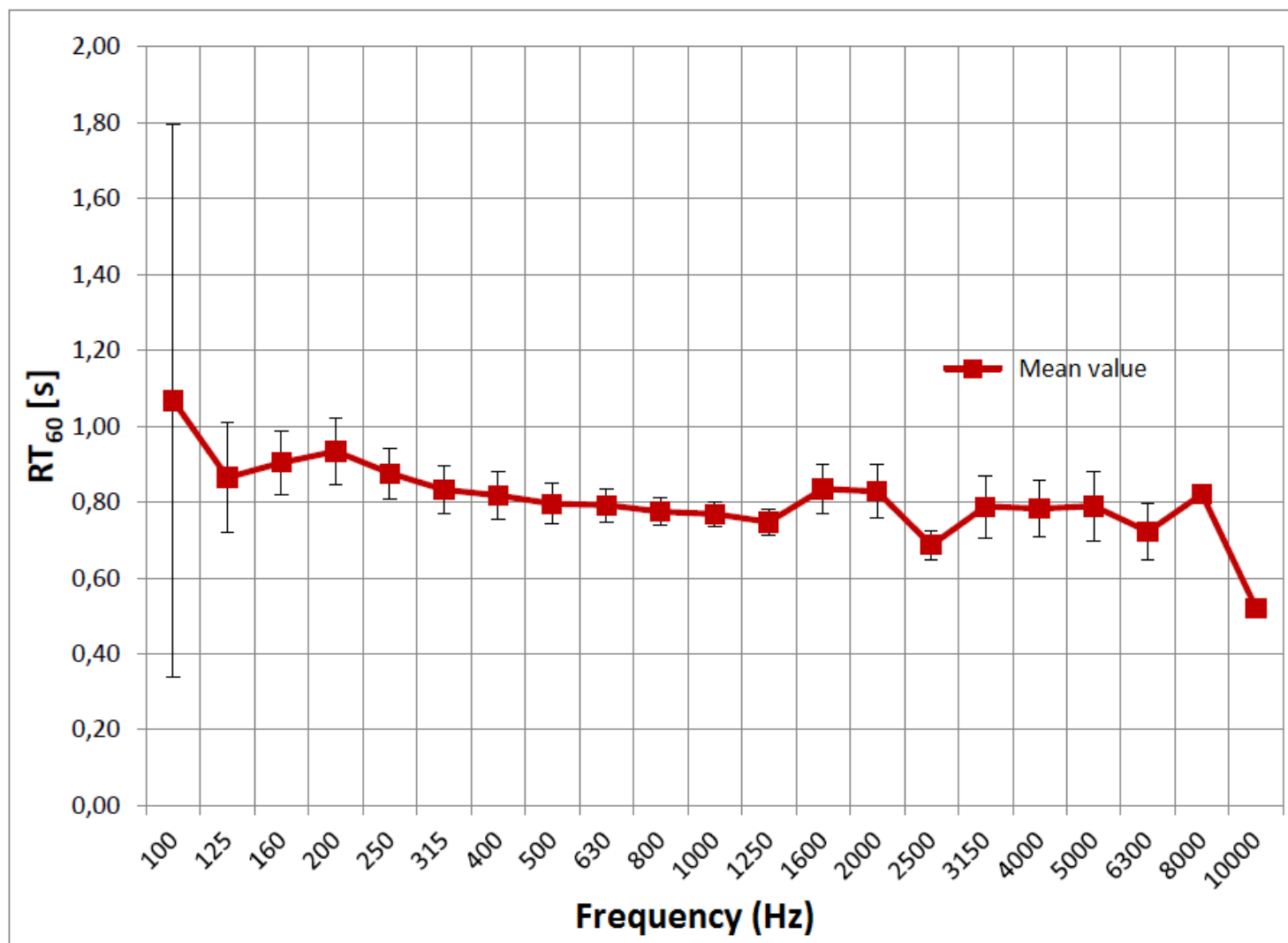
Slanica Concert Hall



Marin Držić Theatre

Marin Držić Theatre	RT_{60} (s)	EDT (s)	BQI	G_{mid} (dB)	C_{80} (dB)	$ITDG$ (ms)	V/N (m ³ /pers.)	STI
Measured values	0.78	0.72	0.71	1.6	5.9	4.20	5.8	0.68
Symphonical music								
Chamber music								
Opera								
Speech								
Cinema								

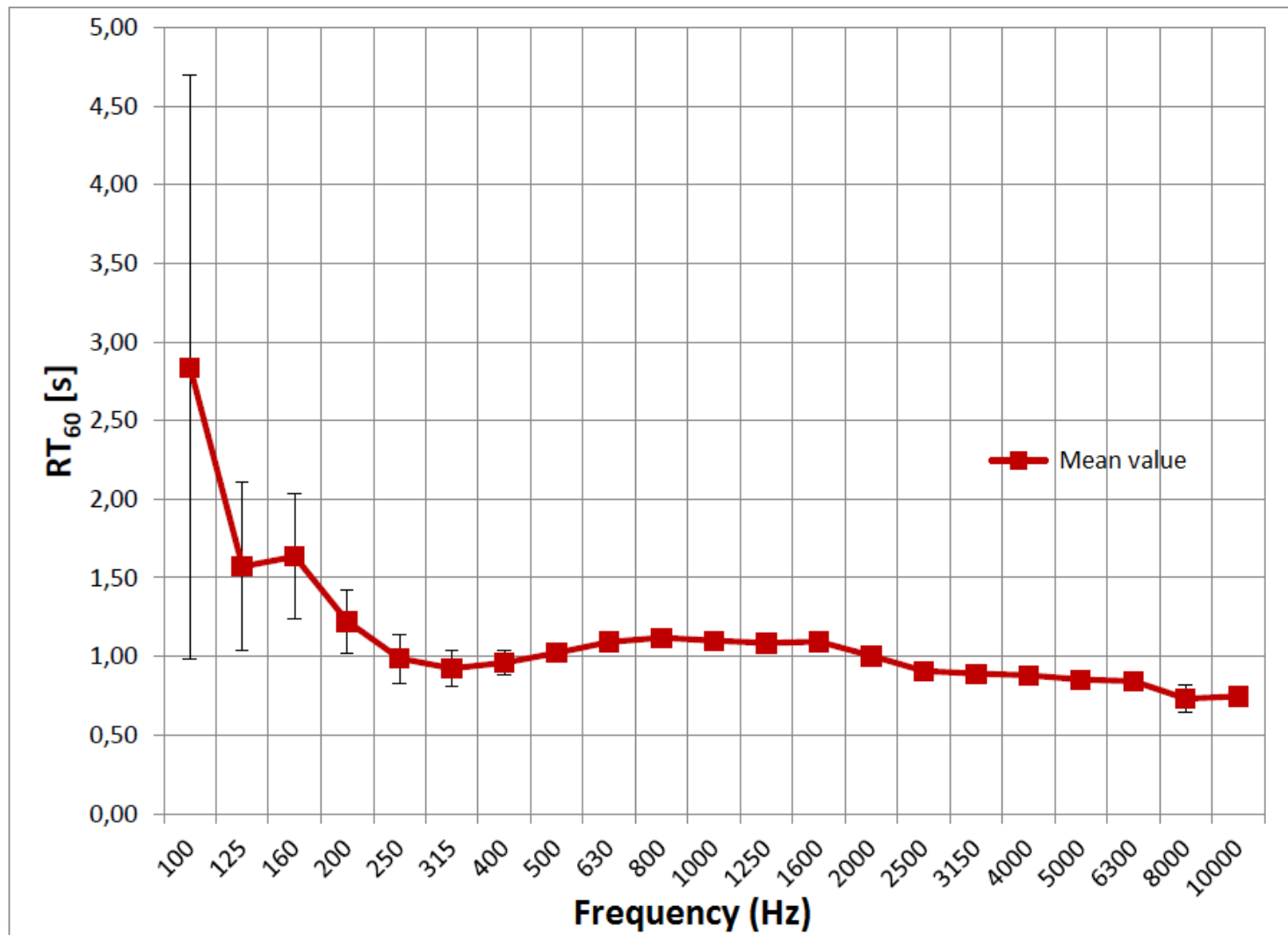
Marin Držić Theatre



Sloboda Movie Theatre

Sloboda Movie Theatre	RT_{60} (s)	EDT (s)	BQI	G_{mid} (dB)	C_{80} (dB)	$ITDG$ (ms)	V/N (m ³ /pers.)	STI
Measured values	1.06	0.94	0.75	4.6	3.6	4.38	7.7	0.62
Symphonical music								
Chamber music								
Opera								
Speech								
Cinema								

Sloboda Movie Theatre



Conclusions

- spaces not built for their present purpose → acoustically inappropriate
- certain improvement possible in some spaces
- others are fundamentally inappropriate
- evaluation in the unoccupied state → improvement with people present
- historical appeal → a cultural event in such a place → a unique experience

Thank you for your attention!