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AIR-OPENED AUDITORIUM AND BACKGROUND NOISE

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Abstract

This article has been written to consult possibility of building air-opened turning auditorium for summer theatre in park part of town České Budějovice. Sound breeds sounds making communication and concentration difficult.

In present there is turning auditorium in castle garden of Český Krumlov Castle. That´s why the first measuring was made during Dvořák´s Rusalka opera in Český Krumlov. The second measuring of noise was made in specified place in Stromovka part. Based on those datas we have done comparisons between both places Český Krumlov and Stromovka Park in České Budějovice from the point of view of background noise there. Place situated in Stromovka´s Park of České Budějovice has been interfered with traffic noise from near highroad E55.

INTRODUCTION

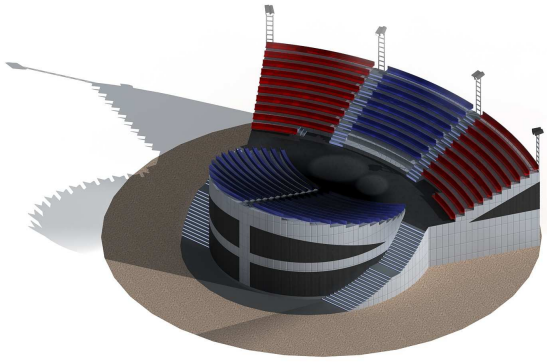
The place for summer open air theatre with turning air-opened auditorium has been found in České Budějovice. The perfomances just now have been held in in Český Krumlov Castle Garden. They used to perform only during summer months from 21.30 o´clock untill 24 o´clock.

It is not possible to behave the present open –air theatre in Český Krumlov Castle Garden because of the reason of Český Krumlov is written on the list of UNESCO. So that´s why the new place has been looked for. Site found by operator and owner of an auditorium (Town of Ceske Budejovice) is places in South-west part of town in natural park of Stromovka. Natural character of park provides more scenic potential than Český Krumlov´s Castle Garden. There unlimited spatial capacity would be and chance to build sets and structures on “field stage” as wanted.

A determining idea for a new theatre structure was to build something more and better than the old one in Český Krumlov. Polydimensional stage becomes like a best solution for certain needs of this site.

Scenic potential of polydmensional auditorium is much wider than simple frontal revolving auditorium than present one situated in Český Krumlov´s Castle garden.Conceptual scenic principles have been taken by results of famous works of architect Joan Brehms who conceived idea of revolving auditorium in 30´s of 20th century during his studies by Walter Gropius at Bauhaus school in Weimar Germany. Schema of "Total Theatre" from there is known as principle of setting central arena between two opposite fronts (auditoriums) by two revolving amphitheatric segments where central segment has been inserted into outer one. *(see scheme bellow)*

So in a first (I) position all audience are sitting in frontal rows and watching same scene. After setting-up to a second (II) position auditorium is transformed to an Arena central stage in between fronts.



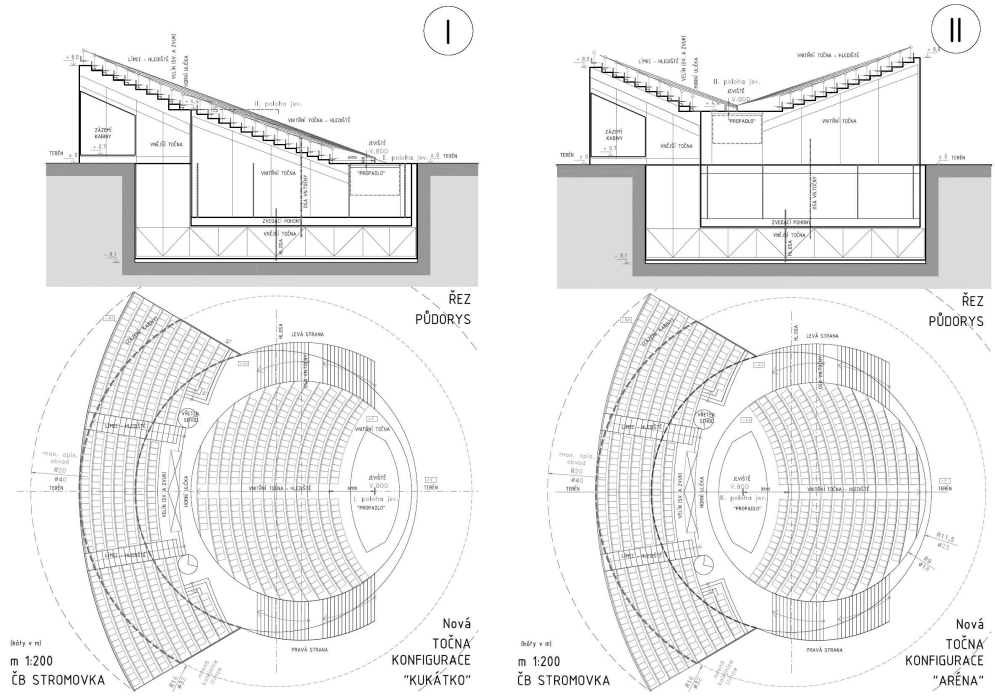


Figure 1 – Air-opened turning auditorium

Planning of the realisation has shown by a few problems especially high level of subterranean waters, environmental preservation of some plants in certain area or harmony with town master plan and at not least noise from surrounding sources, from town and traffic...

AIR OPENED THEATRE AND BACK GROUND NOISE

The purpose to build the new summer theatre with air opened turning auditorium in one part named Stromovka in České Budějovice was considered from point of view of noise. In the first step it is necessary for the determinated building place to check if this locality meets for given purpose from point of view of existing noise level (background noise). Under standards there is limit for background noise in theatres $L_{Amax} < 35$ dB. This value is given only for closed rooms or else from the cause to keep a high acoustical quality of listening for listeners it is this above written necessary value markedly no-step over not even in air opened area.That´s why the first measuring was made by Dvořák´s Rusalka opera in Český Krumlov. The second measuring of noise was made in specified place in Stromovka part in hight 12 m above ground level. Based on those datas we have done comparisons between both places Český Krumlov and Stromovka Park in České Budějovice from the point of

view of background noise there. Place situated in Stromovka´s Park of České Budějovice has been interfered with traffic noise from near highroad E55.

The measuring of noise was done during the whole performace of Antonín Dvořák´s Rusalka in place of turning auditorium in Český Krumlov on the 31st of June, 2005. Minimum values of acoustics pressure during this opera decrease right to value L_{AFmin} = 31 dB(A). It is obvious background noise level in Český Krumlov meets requirements of this standard.

The place chosen for building of air-opened theatre in part Stromovka is within easy reach by traffic noise from nearby main road E55, by noise from nearby restaurant and by noise from own town České Budějovice. For this reason the measuring of background noise was done on the 11th August,2005 and on the 12th August,2005 from 21.00 untill 24.00 o´clock. Scanning noise was provided in 1-minute intervals. Microphrone was situated in the height of 4m above ground. Background level in given point reaches values $L_{Aeq\ t=1\ min}$ = 41 – 47 dB(A). Maximum values of background noise level reaches to values L_{AFmax} = 60 dB(A).

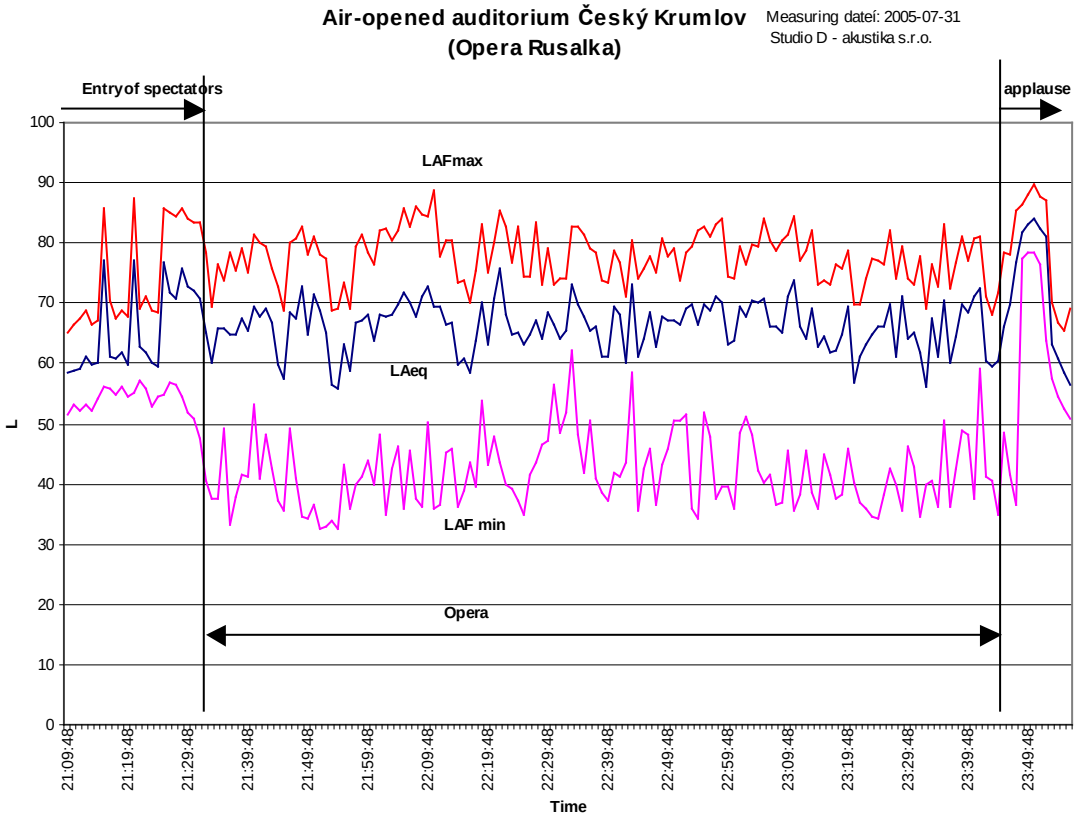


Figure 2 – Acoustics pressure in time L_{Aeq}, L_{AFmax}, L_{AFmin}
Air-opened turning auditorium –Český Krumlov Castle Garden

If we compare minimum value of acoustics pressure measured in Český Krumlov with maximum levels of acoustics pressure measured in Stromovka it is self-evident mascing of noise will be expired in the silenter parts of opera and above all by

players. Noise measuring was provided by opera during which higher acoustics level was recorded than for instance by player. But also during opera performance backgroung acoustics level will cause severely on acoustics quality of listening spectators sitting on air-opened turning auditorium.
Based on the analysis of measured values it is possible to say acoustics pressure level from traffic on E55 and noise from town will last for about 10% of time during opera Rusalka higher then acoustics pressure of own opera in given locality. By player when acoustics pressure drops down to minimum value during longer time moments the share of ambient noise perception lasts longer.

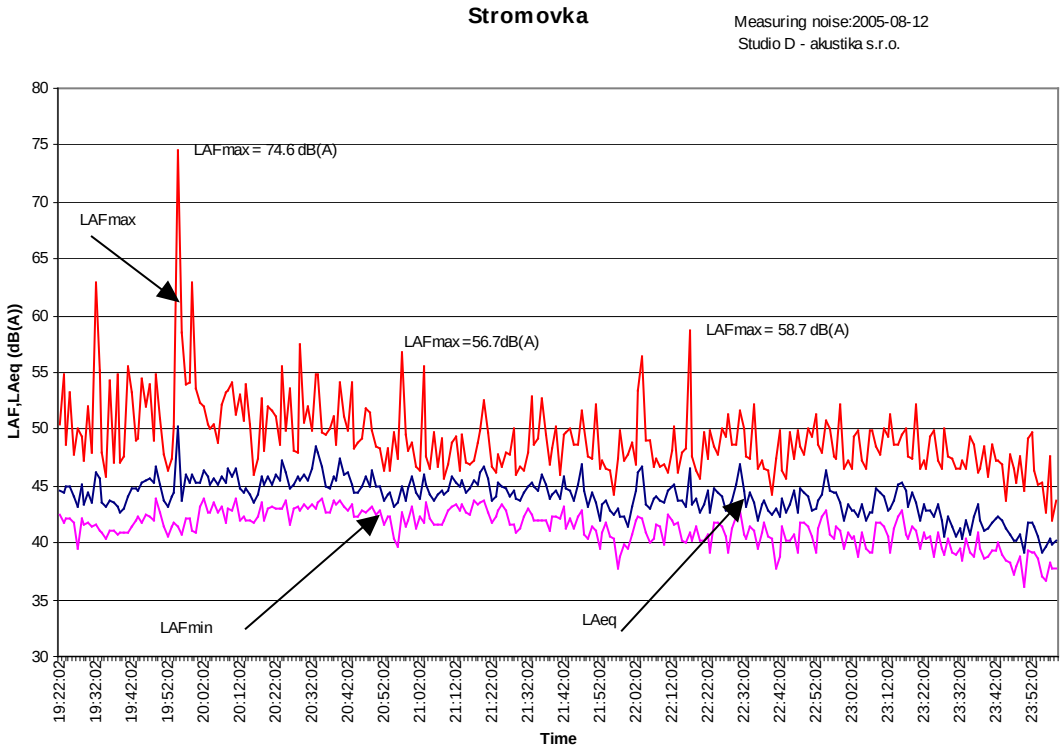


Figure 3 – Acoustics pressure in time L_{Aeq}, L_{AFmax}, L_{AFmin}
New localite České Budějovice

Maximum acoustics pressure up to L_{Amax} = 89 dB(A) and $L_{Aeq\ t=1\ min.}$ = 58 dB(A) up to 74 dB(A) were reached during Rusalka performance in air-opened auditorium in Český Krumlov. Of course background noise in Stromovka has reached up to L_{AFmax} = 58,7 dB(A) and $L_{Aeq\ t=1\ min.}$ = 41 dB(A) up to 48 dB(A).
It is entirely obvious that tested place considering high background noise level is not suitable for performances. Back ground level in tested place has begun admittedly after 23.15 a little to come down but on the needed one the background noise level

will not decrease until 24.00 o´clock. With respect to performances that have begun at 21.30 o´clock it is necessary to count with background noise higher.
The needed value is on this place markedly stepped over. The minimum values of acoustics pressure during performance of opera Rusalka in Český Krumlov have reached values $L_{AFmin,t=\ 1\ min.}$ 31 dB(A). The minimum values of background noise have reached in given place values of $L_{AFmint=\ 1\ min.}$ = 39 – 43 dB(A). The difference of measured values of minimum acoustics pressure is then 8 – 12 dB!!!

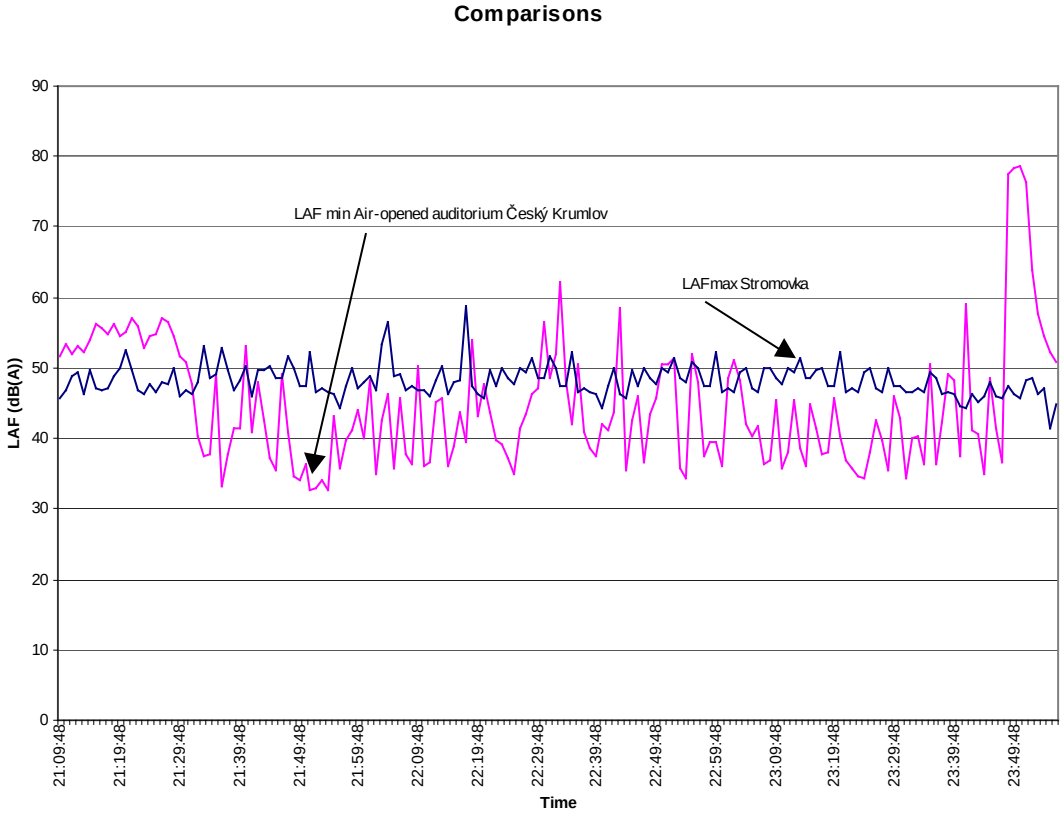


Figure 4 – Comparisons - Acoustics pressure in time L_{Afmax} Stromovka L_{AFmin} Český Krumlov

Acoustics pressure levels during performance Rusalka opera in Český Krumlov have reached up $L_{Aeqt=\ 1\ min.}$ 58 –75 dB(A). Background noise in given place has reached in new place values up to values $L_{Aeqt=\ 1\ min.}$ = 43 – 50 dB(A).
From above written it is obvious that the attainment of such acoustics quality like in Český Krumlov is not possible to reach in given place.
To reach good straightforwarding and with this also quality listening the differnce between acoustics pressure level spreading from performace and background noise must be min. 15 dB.

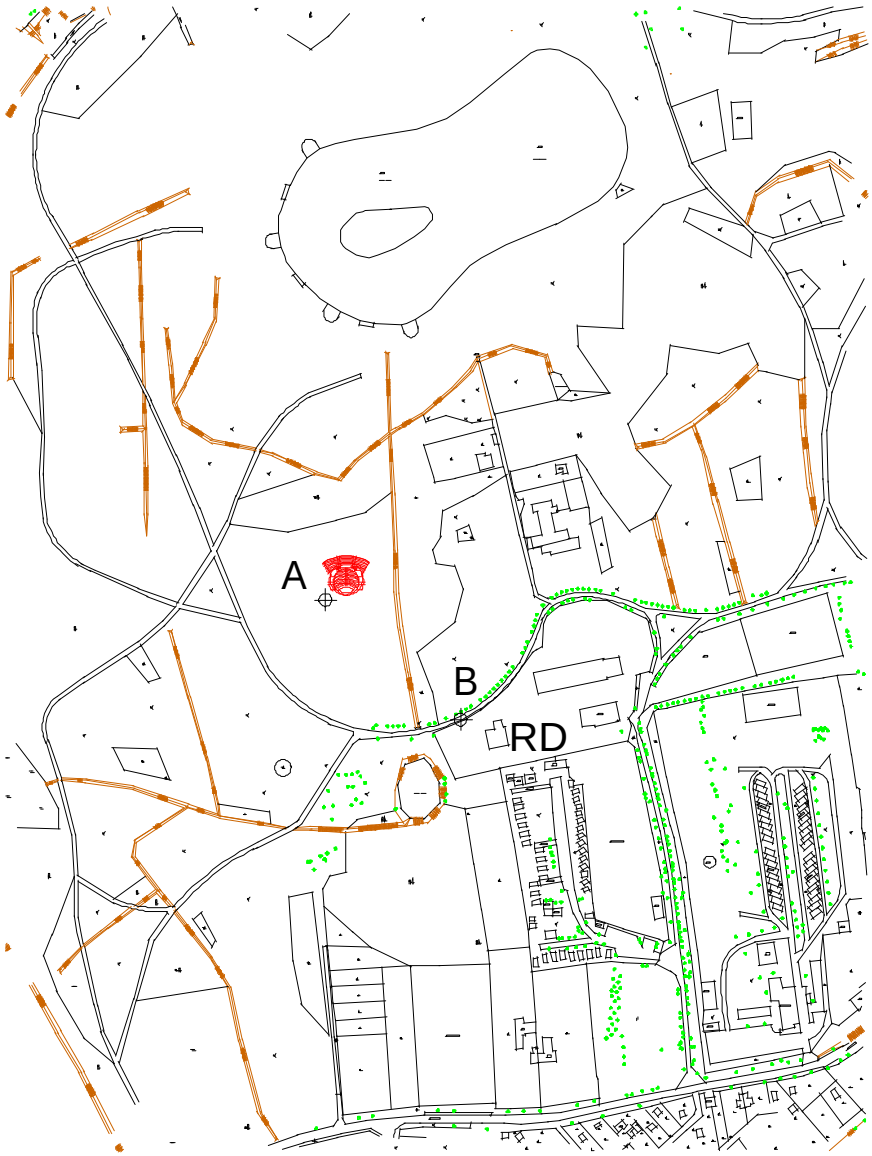


Figure 4 – Situation

SUMMARY

The above written deals about placing air-opened auditorium in areas with very low background noise. Placing of air-opened auditorium in the areas without having backgroud noise level about $L_{Aeq} < 30$ dB(A) always has been connection with a great problems with acoustical quality for listeners.

REFERENCES

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