

SUPSI

Radon Case Studies: ventilation of crawl space

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Starting Situation

- Passive dosimeter measurements:

Floor	Room type	Rn[Bq/m ³]
1	Hobby room	773



- Medium concentrations measured in the living room at the ground-floor.
- Probable higher concentrations in other livingrooms at the floor located below the ground level

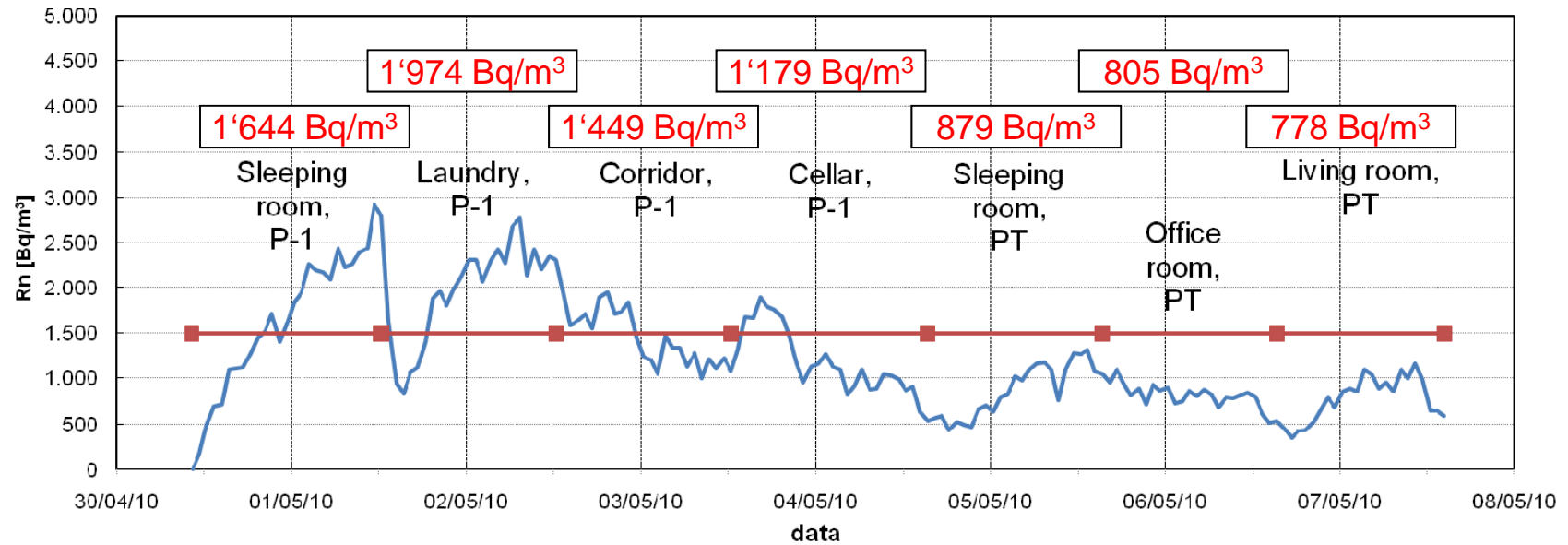
Building Description

- Single family house built during the second half of the last century.
- Basement floor entirely located below the ground level :
 - Lived rooms: sleeping room (pass. dos.), toilet
 - Non-lived rooms: laundry, cellar
- Ground-floor:
 - Lived rooms: living room, kitchen, toilet, entrance hall, 2 sleeping rooms
- Floors connected by a internal stairs. The air connection can be interrupted by closing a door.
- Presence of a loose stone foundation (does not cover the entire building surface).
- Presence of multiple fissures in the under-floor.



Active Short Measurement

- 7 days: 06.10-13.10.2011



Proposed Solutions

- Loose stone foundation ventilation.** Because of the probable penetration of radon many points of the house wrapping we proposed the installation of a fan in order to ventilate the loose stone foundation which could put under depression the soil underneath the building.
- External/Internal radon pit.** Construction of a radon pit which could put under depression the soil underneath the building.



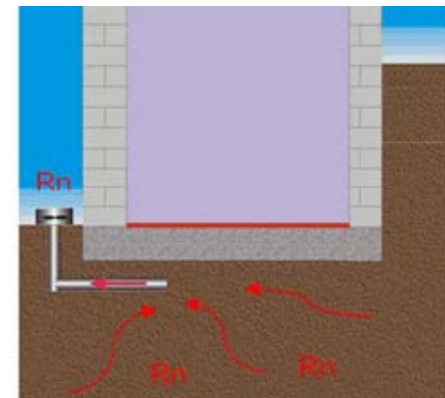
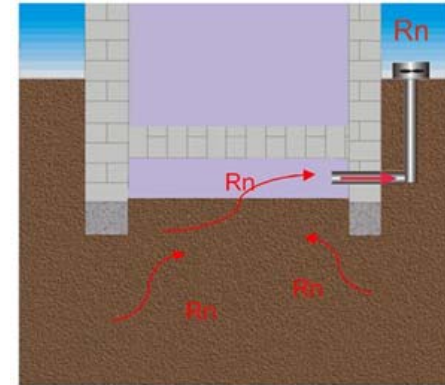
fan description:

Name: HELIOS Type RR 100 C

Type: Radial fan

Performance: 70 Watt

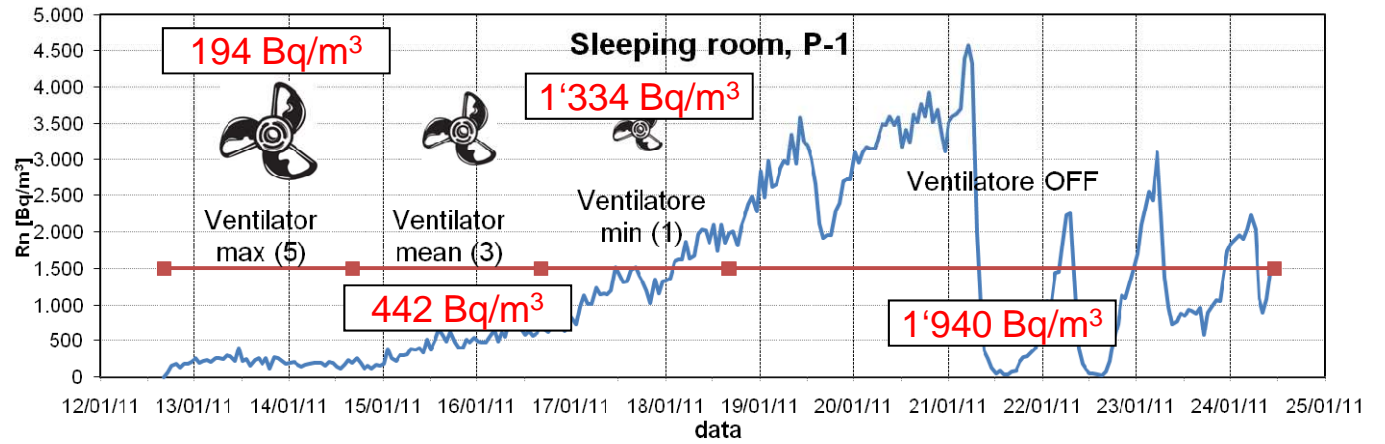
Air output: 240 m³/h



Proposed Solutions Advantages / Disadvantages

	Advantages	Disadvantages
Loose stone foundation Ventilation	<ul style="list-style-type: none"> • Probable higher efficacy on the entire house • Lower costs 	<ul style="list-style-type: none"> • Maybe not sufficient • Possible noise for neighboring houses
External/Internal radon pit	<ul style="list-style-type: none"> • The pit can be executed where is mainly needed → punctual intervention 	<ul style="list-style-type: none"> • Higher costs • Possible noise for neighboring houses

Adopted Solution: Loose stone foundation ventilation



Total Intervention Length: 26.05.2010 - 25.01.2011 (13 months)

Costs: about 2'000 CHF (1'500 EU)



Final considerations

- With respect to previous measurements radon concentration decreased considerably in the sleeping room (lower floor) and in the office room (upper floor).
- Radon concentrations reached previous levels when the fan is turned off (similar to passive dosimetry results and active measurements).
- The installation should work 24 h/d during the heating season (the ventilation power has to be maximum).
- In order to create a higher depression underneath the building the outdoor (2) and indoor (1) air exits need to be hermetically closed.
- It is highly advised to install a silencer in order to decrease the fan noise.
- Once the installation finished, the house radon recovery has to be certificated (passive dosimeter during heating season)