



ISSN NO. 2320-5407

Journal homepage: <http://www.journalijar.com>
Journal DOI: [10.21474/IJAR01](https://doi.org/10.21474/IJAR01)

INTERNATIONAL JOURNAL
OF ADVANCED RESEARCH

RESEARCH ARTICLE

Radon concentration indoor levels in building of college of basic education – Al Muthanna University.

Hayder Salah Naeem.

Science Department, Basic education college, Al Muthanna University, Iraq.

Manuscript Info

Abstract

Manuscript History:

Received: 18 February 2016
Final Accepted: 19 March 2016
Published Online: April 2016

Key words:

Radon, CRM, Building Materials,
Al Muthanna area.

***Corresponding Author**

Hayder Salah Naeem .

In this study, was accomplished to get radon concentration at 15 locations in building of college of basic education, which divided for three levels .In ground level, has three locations as labs. Second and third have six locations as students class .The measurements did in natural time with normal ventilation and using the locations by lecturers and students .Duration 24 hours was reading concentration of radon each location from February to April. The higher radon concentration was 14.4 Bq/m³ in class No. 4 and lower was 5 Bq/m³ in class No.1.

Copy Right, IJAR, 2016.. All rights reserved.

Introduction:-

Radon (²²²Rn) is a radioactive noble gas sent out by the decay of ²²⁶Ra. its element of the ²³⁸U decay series. Radon (²²²Rn) becomes decayed to a series of another radioactive element, like ²¹⁴Po and ²¹⁸Po are importance. They contribute the plurality of radiation dose when snuff. The next a number of decay series (²¹⁸Po) convert from to (²¹⁰Po) and it decays at stable (²⁰⁶Pb). Radon (²²²Rn) decays and products reason as main causes of lung cancer [1]. Radon is an odor less, color less radioactive gas, generated from the decay of radium. It is original from uranium that current naturally in rocks, fossil fuels, and soil. Radon is an alpha emitter that decays to one series of alpha emitters' progenies as fully. When we inhale radon gas and these have high energy alpha particles posed health risk to the lung. After smoking, radon gas is the second leading cause of lung cancer in human as estimated [2].

Presently, Al Muthanna University doesn't have any reading of radon concentration. The aim of this study sharing data with radon gas field studying that will helping the relevant researchers in the arrangement, formulating with this field in future

Methodology:-

Study site:-

The building of basic education college includes three levels. Al Muthanna University in south Iraq. Ground level has three areas and using as labs, second and third levels have six areas for each level as students' classes. The materials of building studying areas in general are Iron and a concrete structure, gypsum bricks, limestone bricks and clay bricks. The classes and labs walls are often covered with cement, gypsum and several of these materials are expecting sources of indoor radon to contribute significantly

Radon monitoring (CRM):-

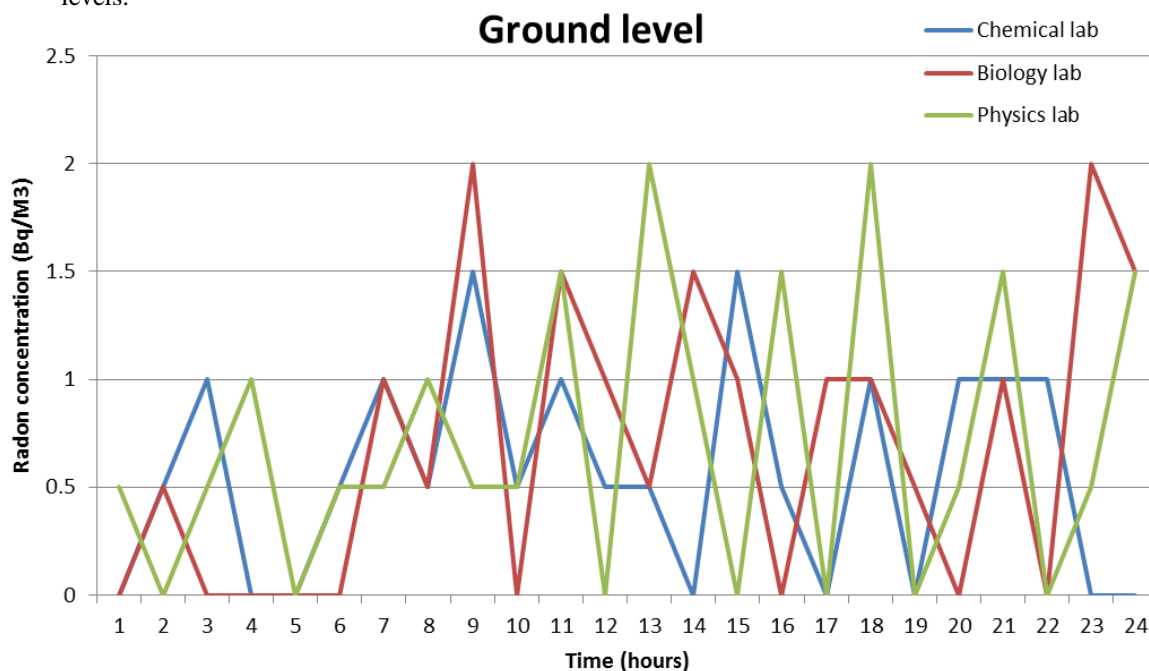
In this study used Continuous radon monitor (CRM model 1029) to measure radon gas, using diffused junction photodiode sensor, manufactured by Sun nuclear company –USA. The CRM be able to produce hourly interval radon concentration which the expert measurement average was manufacturer, recognized and calibrated by the USFPA. Indoor study, the CRM was set and fixed in each area in the ceiling of lab or class and had distance (1m) from the wall and the middle of the area almost.

The measurement stopped after (24 hrs.) later and the recorded hourly internal radon concentration and average concentration for the period of measurement (24 hours), was printing.

Results and discussions:-

The figure (1) shows temporary change time of Rn. Con. for (24 hours) in each the study area. In the figure (1) for each level the indoor variation for comparison purpose, plotted on the same graph. The figure (2) shows distribution of radon concentration for all building levels and shows which location has higher and lower radon concentration. The figure (3) shows distribution of EPA average inside the student's classes / labs and shows also the higher and lower radon concentration in studying case.

In general, the results present that the indoor concentrations in every location in second level are higher than another levels.



(a)

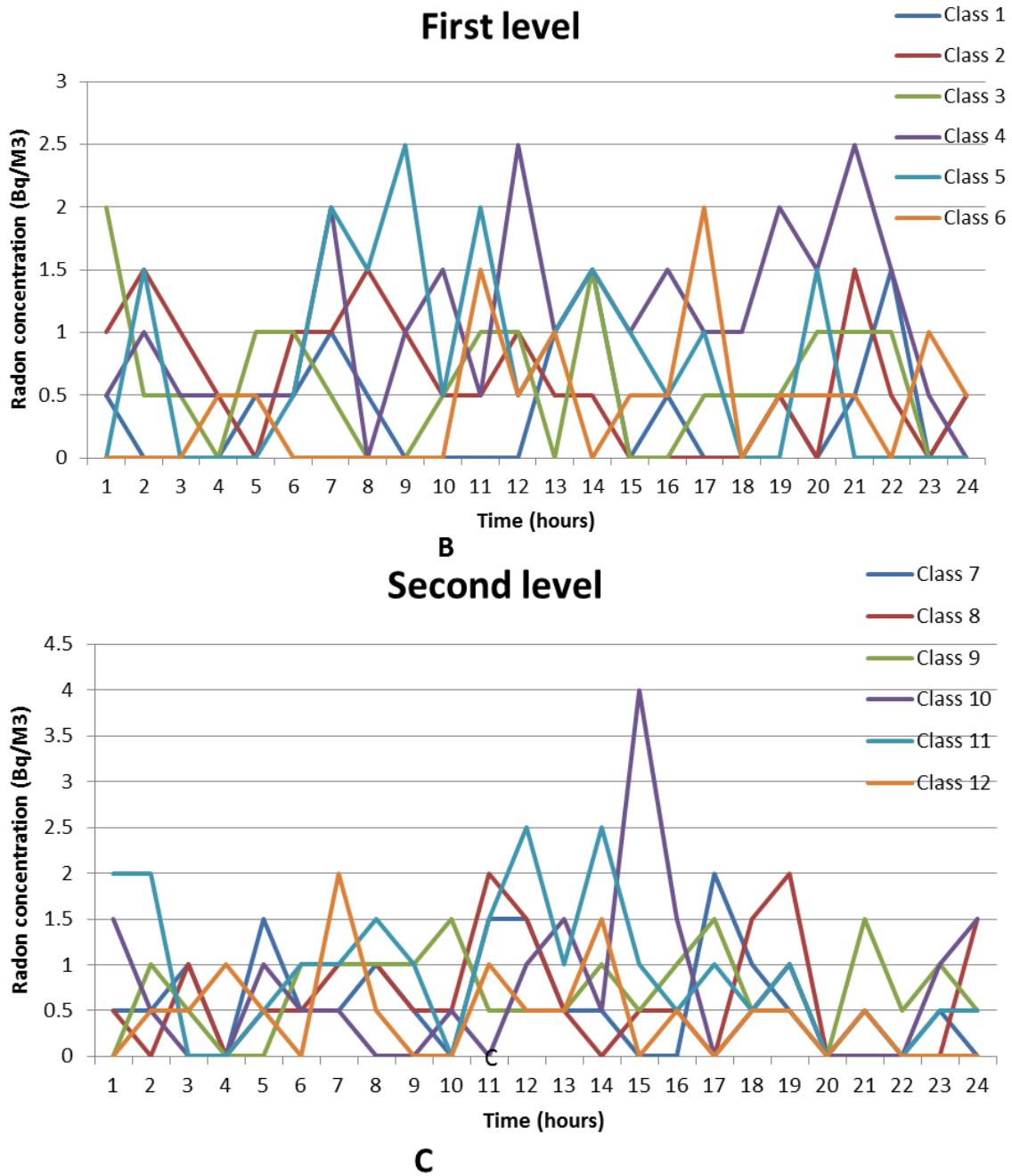


Figure1. Indoor radon concentration (24) hour temporary change time in A-Ground level- First level and second level.

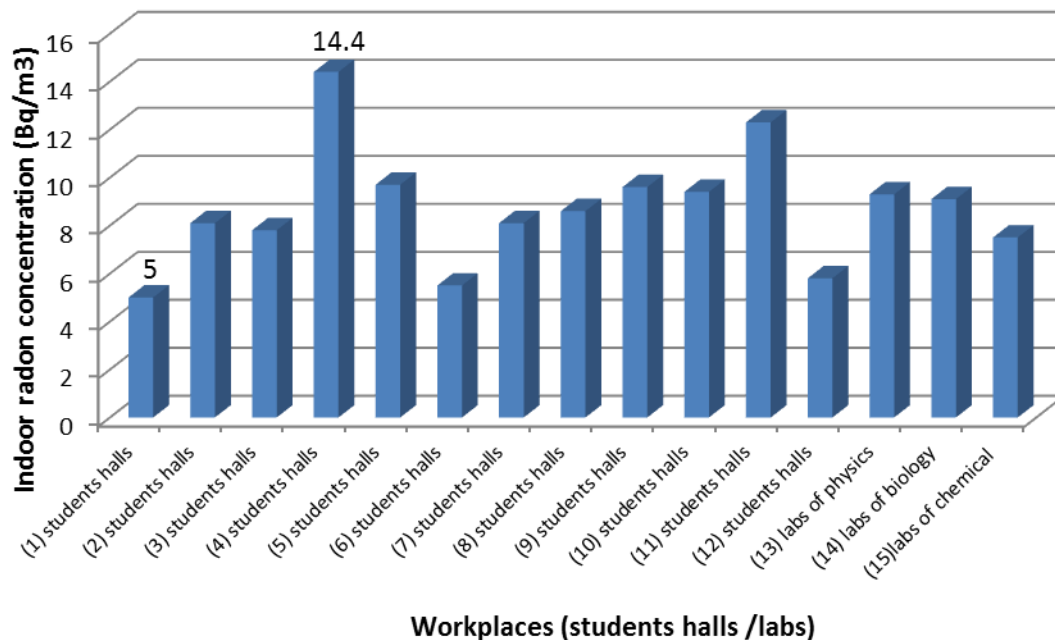


Figure2. Distribution of radon concentration inside the students halls / labs.

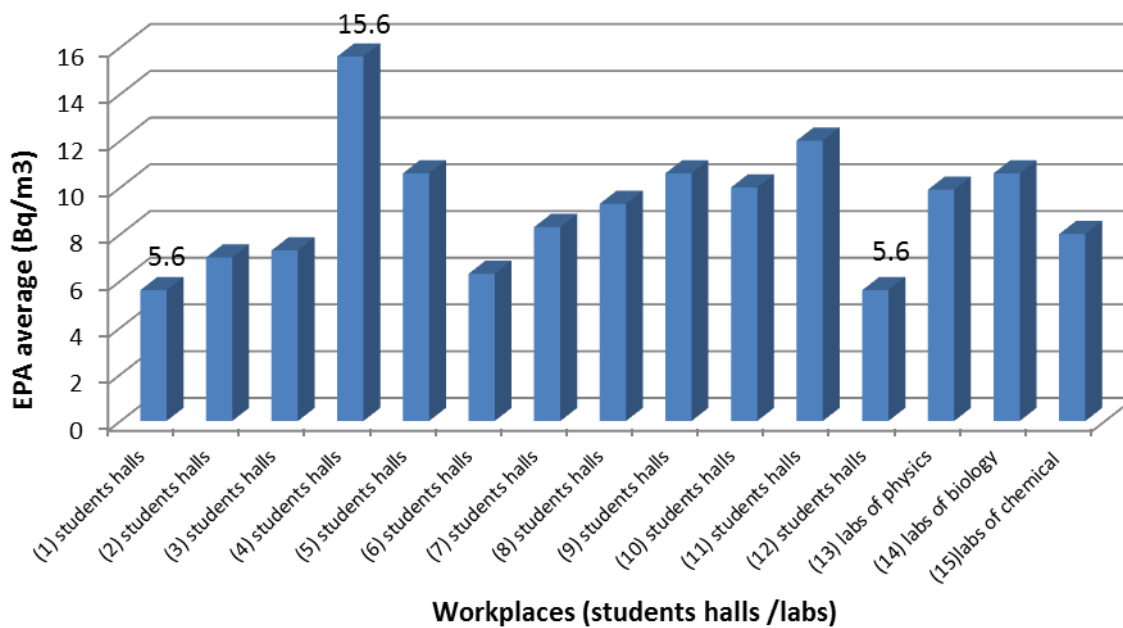


Figure 3 .Distribution of EPA average inside the student halls / labs.

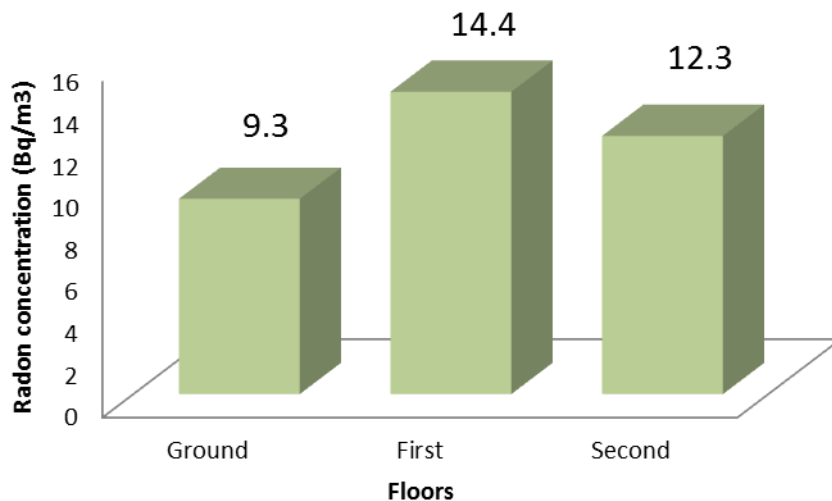


Figure4. A comparison between each level of building as radon concentration.

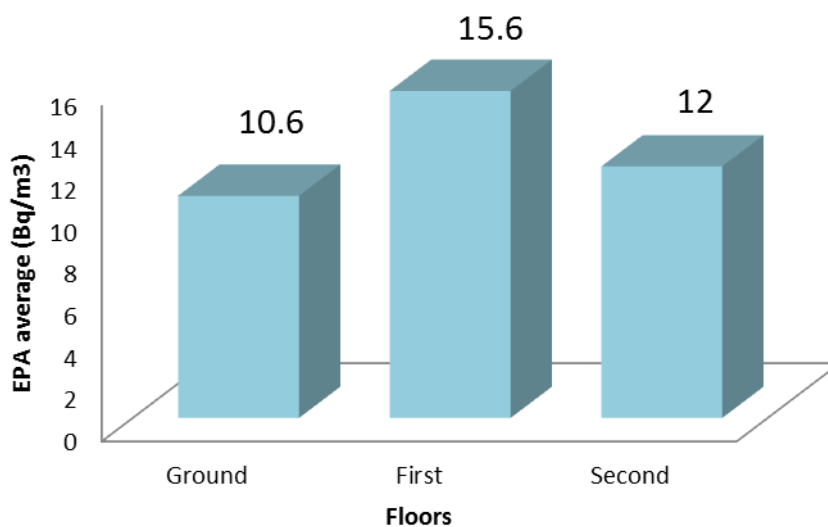


Figure5. A comparison between each level of building as EPA average.

Indoor radon concentration average value, rate of ventilation, workplace temperature, workplace humidity, air pressure and EPA average indoor radon are summarized in table 1. The indoor radon concentration higher found in (No. 4 of student hall) in second level (14.4 Bq/m^3). The indoor radon concentration lower found in (No. 1 of student hall) in second level also (5 Bq/m^3).

Table1. Radon concentration indoor and EPA average.

No.	Workplaces (students halls / labs)	Average indoor radon concentration (Bq/m ³) (overall Avg:)	Rate of ventilation (h/day)	Workplace temperature (c ⁰)	Workplace Humidity (%)	Air pressure (Kpa)	EPA average indoor radon (Bq/m ³)
1	(1) students halls	5	8	24	39	100	5.6
2	(2) students halls	8.1	8	25	29	101	7
3	(3) students halls	7.8	6	19	43	101	7.3
4	(4) students halls	14.4	8	20	36	102	15.6
5	(5) students halls	9.7	8	21	38	102	10.6
6	(6) students halls	5.5	8	22	37	102	6.3
7	(7) students halls	8.1	6	24	37	101	8.3
8	(8) students halls	8.6	5	24	41	101	9.3
9	(9) students halls	9.6	5	24	38	101	10.6
10	(10) students halls	9.4	6	25	37	102	10
11	(11) students halls	12.3	6	25	39	101	12
12	(12) students halls	5.8	6	24	46	101	5.6
13	(13) labs of physics	9.3	5	24	48	101	9.9
14	(14) labs of biology	9.1	5	24	42	101	10.6
15	(15)labs of chemical	7.5	6	26	35	101	8

The differential of results refers to the different ventilation rate, time and date of taken reading. The figure 4, 5 shows a comparison between each level of building as radon concentration with overall average and EPA average respectively.

Conclusion:-

Radon concentrations indoor have been measured inside (15) locations in building college of basic education / Al Muthanna University –Iraq from February to April season. The levels, Veneration rate, material of building and time lecturing effect on the indoor radon concentration and its offspring locations of selected labs or students' hall had different locations in same building. The CRM used to measure the radon concentration and its offspring during spring season .The indoor radon concentration higher and lower were in second level.

Acknowledgement:-

The author deeply thanks all the persons and special Dr. Asaad H. Ismail to help me to finish this case study.

References:-

1. Zakariya A., Mohamad S., Asaad H. "Measurement. of indoor radon concentration. levels and its Risks inside Hospitals in Iraqi Kurdistan Region : Case Study in Autumn season " Physical. and Environmental. Science Research .ISSN 2315-5027, February ,2013.
2. Ahmad S. , Zaini H. and else., "Some Remarks on radon concentration at various locations in peninsular Malaysia", Presented at National physics conference (PERFIK) 2007, on 26-28 Dec 2007 , Kuala Terengganu, Malaysia.
3. Zakariya A. , Mohamad S. , Asaad H. " Effects of floor levels and Ventilation rate on indoor radon and its progeny inside Iraqi Kurditan hospitals "International Journal of Environment and Resource(IJER) Volume 2 Issue 2,May 2013.
4. Zakariya A. ,Mohamad S. , Asaad H. " Measurement of indoor radon-222 concentration inside Iraqi Kurdistan : Case Study in the summer season " Nuclear medicine & Radiation Therapy,ISSN:2155-9619 JNMRT, an open access journal,2013.
5. Zakariya A. ,Mohamad S. , Asaad H. " Measurement. of Radium Content and Radon Exhalation Rates in Building Material. Samples using Passive and active detecting techniques " International Journal of scientific & Engineering research,Vol. 4 Issue 9,ISSN: 2229-5518,September-2013.