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RESEARCH ARTICLE OPEN ACCESS

Electrical Force Emission
AVO meter - Function Generator- Spectrum Analyzer - Dc Power supply

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I. Introduction

The development of labs is one of the goals of the educational system that include the occupational safety and health standards and we choose the Electrical Force emission as my research by choosing the data from three different to represent the sample in my research that I can distribute the result the other labs. The research useful for the teacher and trainer to apply the development the labs within educational program include the safety and health standard to reduce the Electrical force in our labs.

Target:

1. The laboratory safeties are a part of the education systems.
2. Opening the new area to the trainer and engineering to participate the fundamental structure of the labs is considered as a main part of labs experience.
3. Gives the suggestion to how the reduce the Electrical Force in the labs.
4. To know if any failure performs in the labs.
5. Apply the training program into available Electrical Force measuring device on the labs.
6. The new device should be agreeing with Electrical Force safety only.
7. Teaching howe to measure the Electrical Force
8. Apply the short training program about the safety of Electrical Force

Summary:

The research target is to reduce the Electrical force by choosing the samples of electronics labs include deferent number of devices and use the Electrical Force measuring device and use the standard value.

My research question is:

If there any devices in the labs the Electrical force succeeded the standard value? and haw can be treated with these devises? and what should be the action? and what the procedure should be taken to improve the labs according to the research result? and what is the suggestion can be given

Sample surveys:

We choose the devices from three different labs collected in one table represent 109 .

Survey instrument & Statistical analysis

1. Electrical force instrument meter
2. Temperature instrument meter
3. Distance instrument meter
4. Observational from research

Result and recommendation:

The Function Generator is most the device exceeded the standard Electrical Force value and reach 24.7% from the total device , and DC Power supply is the least devices exceeded the Electrical Force standard value 9.1%, from total device the recommendation is re- examination these devise again because its exceed the Electrical force standard value.

Also , specify the number of students at each table, and raise the congestion of devices inside the labs spacing between devices reformulation of experiments to reduce the Electrical Force waves while preserving the scientific material, use the Lab simulation as one of the alternatives available to reduce the Electrical Force of waves during the performance of the scientific experiment.

The Standard:

The standard is 38.83 V/m.

Data collection method :

Devices:

- DC Power (analogue)
- DC Power (digital)
- AVO
- Function Generator

- Spectrum Analyzer
- Oscilloscope

Then the arithmetic mean of the Electrical Force wave reading was taken; the temperature and the principle of the temperature measured for all devices and in the sample laboratories used.

Sample volume:

The sample size was 109 samples.

Answering the research questions:

After taking the results from the sample of the study and in view of the standard that was determined, it constitutes a violation of what is permitted? after observing the table we conclude the following:

1. The most type of device that exceeded the standard is the (Function Generator) device, which was 24.7% from total device
2. While the lowest percentage was (DC Power Supply Digital) 9.1%
3. There is no direct relationship with the increase in the average temperature of the laboratory and the increase from the standard level of Electrical Force waves, as shown in Table (2)
4. When measuring the Electrical Force emitted from electrical panels (DB), no more than the specified standard was recorded as shown in the table.
5. Exposing the devices to sunlight for long periods and the deficiency of protection from its light inside the laboratory contributed to the speedy damage of some devices and put them out of use.

The most important findings and recommendations:

- spacing between devices and tables is importunate to reduce the Electrical force
- Redesigned experiment tables that increase space available.
- Redistribute the devices between the experimental tables, the model.
- Remove high-risk devices from laboratories (AC Transformer) for not being used in experiments so that they do not pose a danger to users
- Re-examine and evaluate the efficiency of the device, devices in which the standard ratio of Electrical Force
- Redesigning laboratory experiments in accordance with the specified standard, in a way that allows to reduce the number of devices used and without prejudice to the scientific material
- Using the technology of merging devices into one training board.
- Benefiting from Lab simulator, which is based on simulation technology

trainer can determine whether the emitted waves conform to the specified standard.

- Benefit from the expertise of the Radiation Protection Department hold training courses for trainers in the field of Electrical Protection.
-Developing a special indicator of laboratory safety so that it is applied to all laboratories within specific criteria, including temperature, the principle of distance measured by the device used in Electrical Force and the permissible amount of it.
- Replacing laboratory equipment tables with ones dedicated to absorbing Electrical Force
- The width distance of the laboratory table must be directly proportional to the number of students allowed at each laboratory table, by reference to the specifications before purchase, and that the number of students at each laboratory table does not exceed the number allowed.

Tabl.1

Lab					
Device	Sample	E.M.F(mg)	Elect.Force(v/m)	Temp °c	Dist. M
Spectrum Analyzer	1	2.1	47	27.9	0.283
	2	1.3	17	24.2	0.30
	3	1	0	24.4	0.233
	4	107	3	24.5	0.233
	5	1	92	23.4	0.350
	6	3.2	30	22.7	0.41
	Mean Value	**19.2**	**31.5**	**24.5**	**0.30**

Tabl.2

Lab					
Device	**Sample**	**E.M.F(mg)**	**Elect.Force(v/m)**	**Temp c°**	**Dist.**
DC Power Supply(analogue)	1	56.7	11	24.1	0.296
	2	38.5	18	24.4	0.365
	3	0.8	34	24.4	0.365
	4	22.7	26	23.4	0.380
	5	76	3	22.6	0.300
	6	20	18	22.6	0.450
	7	91.5	77	22.5	0.240
	8	43	29	22.5	0.17
	9	405	16	22.5	0.300
	10	48.2	6	23.1	0.350
	11	22.5	18	23.3	0.31
	12	40.9	44	17.8	0.350
	13	19.1	5	17.8	0.350
	14	35.9	19	17.8	0.350
	15	24.6	24	17.8	0.350
	16	19.9	22	17.8	0.350
	Mean Value	**60.3**	**23.1**	**21.5**	**0.32**

Tabl.3

Lab.					
Device	**Sample N0.**	**E.M.F(mg)**	**Elect.Force(v/m)**	**°c Temp.**	**Dist.**
Function Generator	1	1.9	44	23.9	0.362
	2	3.9	22	24.1	0.326
	3	0.9	20	24.5	0.387
	4	1.1	0	24.4	0.445
	5	0.9	2	24.4	0.445
	6	0.7	0	24.4	0.445
	7	9.4	23	22.3	0.380
	8	6.3	2	22.7	0.380
	9	13.7	14	23.2	0.380
	10	13.6	18	23.3	0.380
	11	10.7	2	23.4	0.380
	12	13	19	23.3	0.380
	13	3	10	23.8	0.280
	14	3.1	27	22.6	0.410
	15	2.6	31	22.9	0.440
	16	0.9	96	22.7	0.300
	17	0.6	22	22.5	0.250
	18	2.4	37	22.8	0.300
	19	20	4	23.2	0.410
	20	3.4	9	23.2	0.340
	21	6.9	135	20.4	0.320
	22	0.6	183	18.7	0.350
	23	9.7	12	18.7	0.350
	24	0.5	71	18.7	0.350
	25	0.7	41	18.7	0.350
	26	0.7	19	18.7	0.350
	27	9.1	9	18.7	0.350

	Mean Value	**5.1**	**32.2**	**22.2**	**0.36**

Table.4

Lab					
Device	**Sample N0**	**E.M.F(mg)**	**Elect.Force(v/m)**	**°c Temp.**	**M Dist.**
DC Power Digital	1	93.5	2	23.2	0.284
	2	26.4	18	23.6	0.420
	3	59.95	10	23.4	0.350
	4	71.1	4	23.1	0.330
	5	72.7	19	20.0	0.300
	6	56.8	8	18.2	0.300
	7	56.7	10	18.2	0.300
	8	60.2	1	18.2	0.300
	9	90.9	43	18.2	0.300
	10	62.9	6	18.2	0.300
	Mean Value	**65.1**	**12.1**	**20.43**	**0.31**

Tabl.5

Lab					
Device	**Sample**	**E.M.F(mg)**	**Elect.Force (v/m)**	**Temp. °c**	**Dist.**
Oscilloscope	1	4.1	3	24.1	0.370
	2	2.3	78	22.9	0.383
	3	2.4	14	24.1	0.270
	4	0.9	10	23.8	0.270
	5	4.1	5	23.7	0.300
	6	2.9	8	22.5	0.380
	7	1.3	14	22.9	0.440
	8	7.9	2	22.6	0.370
	9	6.1	10	22.6	0.370
	10	1.7	1	25.5	0.41
	11	2.3	20	22.7	0.410
	12	0.9	21	22.6	0.300
	13	0.6	24	22.6	0.30
	14	6.1	64	22.8	0.290
	15	1	1	23.1	0.360
	16	3.5	24	23.1	0.300
	17	2	9	23.3	0.340
	18	0.5	40	19.4	0.360
	19	0.7	4	19.4	0.360
	20	0.5	30	19.4	0.360
	21	0.5	7	19.4	0.360
	22	0.6	1	19.4	0.360
	23	0.6	5	19.4	0.360
	24	0.4	47	19.4	0.270
	Mean Value	**2.2**	**18.4**	**22.1**	**0.34**

Tabl.6

Lab					
Device	**Sample**	**E.M.F(mg)**	**Elect.Force(v/m)**	**Temp. °c**	**Dist.**
AVO Meter	1	3.5	4	23.5	0.285
	2	42	28	24.1	0.303
	3	1.9	6	23.6	0.340
	4	2.5	4	23.7	0.360
	5	3.7	4	23.7	0.360
	6	2.4	26	23.6	0.370
	7	1.5	6	23.5	0.430
	8	7.9	50	22.6	0.220
	9	5.3	7	22.6	0.280
	10	9.4	46	22.9	0.150
	11	29.9	39	22.9	0.150
	12	15.1	111	22.9	0.210
	13	8.7	180	22.5	00.22
	14	10.7	19	22.5	0.240
	15	8.3	1	22.5	0.240
	16	1.8	10	20.4	0.320
	17	1.9	11	20.0	0.300
	18	2	17	19.3	0.410
	19	0.7	38	19.3	0.410
	20	1.3	3	19.3	0.410
	21	0.8	6	19.3	0.410
	22	0.9	8	19.3	0.410
	23	0.8	4	19.3	0.410
	24	0.7	23	19.3	0.410
	25	1.1	96	19.3	0.330
	26	2.4	17	19.3	0.400
	Mean Value	**6.4**	**29.3**	**21.5**	**0.32**

Table.7

		Mean Value			
Device	**#**	**E.M.F (mg)**	**Elect.Force (v/m)**	**°Temp c**	**Dist. M**
DC Power (analogue)	16	60.3	23.1	21.5	0.32
DC Power (digital)	10	65.1	12.1	20.43	0.31
AVO	26	6.4	29.3	21.5	0.32
Function Generator	27	5.1	32.2	22.2	0.36
Spectrum Analyzer	6	19.2	31.5	24.5	0.30
Oscilloscope	24	2.2	18.4	22.1	0.34

Table.8

			The number of devices that exceeded the specified standard (38.83 V\m) Elect.Force						
% Lab	Tot.Devices	Tot.exceed Devices	Oscilloscope	DC Power Digital	DC Power Analogue	Spectrum Analyzer	Function Generator	AVO meter	Lab
17.4	109	19	4	1	2	2	5	6	
			16.6	10	12.5	33.3	18.5	23	%

Tabl.9

Lab	Exp.Table	E.M.F(mg)	Elect.Force(v/m)	°c Temp	Device/table
	1	8.1	50	18.1	6
	2	20.1	1	18	5
	3	57.8	42	18.2	3
	4	22.5	42	17.9	7
	5	39.7	46	17.9	11
	6	9.2	34	18	5
	7	45.3	15	18.2	6
	8	2.9	17	18.2	5
	9	53.1	5	18.7	5
	10	39.2	2	18.8	8
	11	57.3	6	18.8	5
	12	39.2	9	18.9	4
	13	77.6	4	18.9	4
	14	46.8	34	20.1	5
	15	40.3	5	19.7	6
	16	10	44	19.3	4
	17	3	4	19	1
	18	57.9	7	18.8	4
	19	8.6	9.6	18.7	2
	20	9.4	35	18.7	4
	21	0.7	8	18.7	4
	Mean Value	**32.03**	**18.4**	**18.6**	**5**