Digital direction device model to reduce private reading difference in analog survey meter

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1. Introduction

Because dosimeter used in radiation measurement is shown different response for same dose rate according to kind and energy of measurement sample radiation, must know kind and energy of radiation of each device to get exact measurement. Therefore in using of detec tor at work, it's very important to make a n estimate of the reaction according to radiation. This is adequate by the correction.

But as important thing of authoritativeness about d that is used dosimeter and gets may be impact by mea surer private interpretation difference as proofreading. The reliability to the results according to the detector associated with the correction and the private reading difference.

2. Main discourse

Radiation dosimeter was formed measuring detector, amplifier that amplify electric signal that enter from discriminator and meter instrument that to be shown electric signal. And can divide by digital and analogue system according to the output of the meter instrument. Output data is described by the number or the character in digital system, and is acknowledged by reading the indicating point.

2.1. Factors effected on reading value

In case of measurement using analog dosimeter, factors affected on reading value of measurer can be classified by greatly two. Mostly analog dosimeter is made of Indicator and selector that can control the level range (x0.1, x1, x10, x100 etc.). And can read count value by reading the scale of the point that controls range according to dose rate.

This makes a little hunting, so the measuring value is different by the measurer. This is a primary factor.

In what you see in the indicator, there is gap in scale, in case of the scale indicates in gap, reading the measuring value is as for the second factor.

Shown in Fig 1, it describes the typical Indicator of the analogue dosimeter. In Fig 1, the gap of scale is regularly or in case of range in "x100" (most of high radiation measuring), it's more narrowed and at irregular intervals. As the scale indicates in gap, measurement value is affected by the measurer, it's more significant where the gap is in a narrow or regular way.
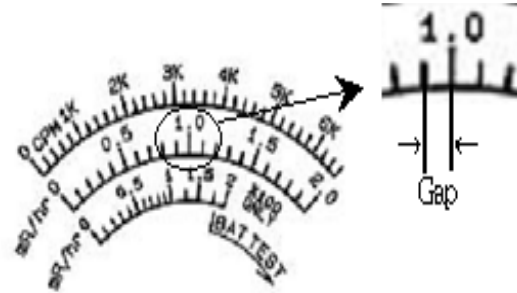

Fig 1. Interval of Indicator Scale and Gap

2.2 . Testing the difference of reading

Shown in Table 1, the dose rate is different according to the measuring environment an the measurer in using dosimeter Ludlum Model 3 Survey meter (measuring range: 0~200 mR/hr). It should be changed by measurer because the Hunting of scale is occurred or hard to read between the Gap. Digital dosimeter can solve the problem with the gap, but can't solve the problem by the hunting.

(Unit : mR/hr)

Section	Test 1	Test 2	Test 3	Test 4
Measurer A	0.18	0.40	14.20	110
Measurer B	0.19	0.30	15.00	120
Measurer C	0.17	0.32	14.50	130
Measurer D	0.11	0.40	15.00	120
Measurer E	0.10	0.39	15.55	140

Table 1. Testing the different reading value by measurer

2.3 Making up digital direction device

In order to solve these problems, digital direction device is attached to analogue dosimeter. It can control the measuring time by the propose, besides this attempted to clear the private measuring difference by displaying average value to digital that collects signals entering for the set time. Diagram of the detector is Fig 2, it explains each part of it.
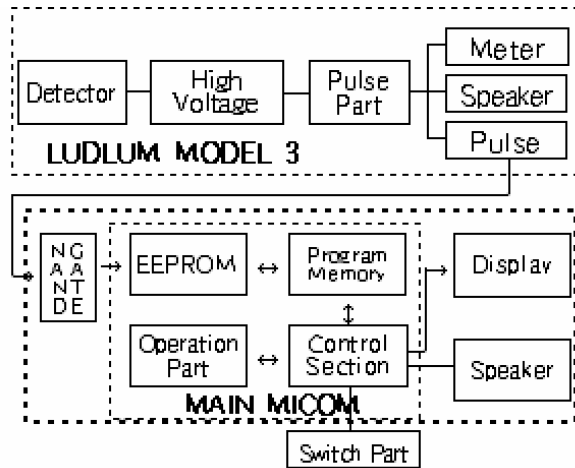
Fig 2. Outline of Device

NAND GATE converts polling edge a square wave data pulse signal from analogue detector (Ludlum Model 3 Survey Meter) to rising edge a square wave data pulse signal to display digital that is able to control time. It consists of EEPROM that store rising edge a square wave data pulse signal, program memory that converts rising edge a square wave data pulse signal in EEPROM to digital signal, and controlling part.

Also display part is marked by character and number which digital signal is converted by program memory. And calculation part that is calculates the average value of digital signal from program memory for the set time.

And there is speaker letting know by the sound when the detection is terminated and Switch part that checks control part where is outside.

Fig 3. prototype of device

3. Conclusion

As stated above, it is expected that can trust more and can get exact output regardless of measurer's position or viewpoint. Especially, may use usefully in case of getting comparive and accurate value. In all measurements it can't be possible to measure perfectly. Therefore it needs to improve working environment and get rid of causes that is expected to effect on the reading value.

REFERENCES

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