13 - 18 May 2012 ■ SECC ■ Glasgow ■ Scotland

STUDY OF THE TRIAGE METHOD FOR RADIOLOGICAL MASS CASUALTY EVENT USING PLASTIC SCINTILLATOR

Jaeryong Yoo, Minjeong Pak, Wi-Ho Ha, Seung-Sook Lee

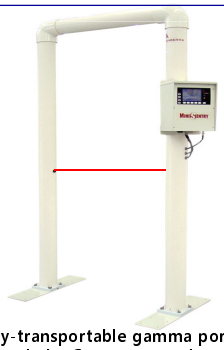
Health Physics Team, Korea Institute of Radiological & Medical Sciences(KIRAMS)
215-4, Gongneung-Dong, Nowon-Gu, Seoul 139-706, South Korea
e-mail : jerome@kirams.re.kr

I. INTRODUCTION

Use of radiation or radioisotopes in the field of industry, medical and research purposes are constantly increasing. With use of nuclear or radiation has incidence possibility. In Korea government established the NREMC for protect citizens from nuclear, radiological accidents or radiological terrors through the emergency medical preparedness. Normally, internal or external contamination is distinguished by surface contamination monitor or surveymeter directly. However these methods have some disadvantages. Furthermore, the result of these methods could be made a problem at the radiation emergency mass casualty. For overcoming those disadvantages, our institute introduced specified equipments for triage the contaminated victims at the radiation emergency scene. It could handle many people in a short time (typical count time being one to two seconds) so it is possible to reduce the need of staffs for triage.
In this study, we tried to find effective detection zone of portable portal monitor for triage the contaminated and non-contaminated victims at the radiological mass casualty.

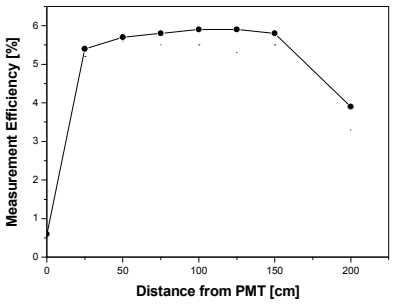
II. MATERIALS & METHODS

- Designed to meet the requirements of the contamination monitoring standard for a portal monitor used for radiological emergency response published by the FEMA 1995
- Introduced PSD (fast response, relatively low cost and easy to formation)
- Three different operational modes
  Walk-through (provides higher throughput(0.1~5.0 sec/person) → suitable for pedestrian traffic)
  Enter-wait (for higher sensitivity or in high background applications → loner count time)
  count-rate (occupation interval of the portal may be extended → vehicle traffic)
- Efficiency measurement position (height : 0~2 meters, side position : 0 ~ 0.8 meters)
- Radioactive Cs-137 source (plateau process and efficiency measurement)
  - radioactivity range (16,428 ~ 114,996 kBq)



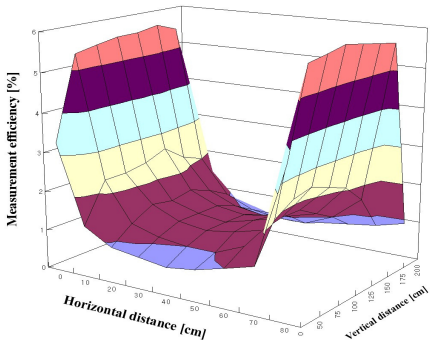
Minisentry-transportable gamma portal monitor (made by CANBERRA Industries)

III. RESULTS



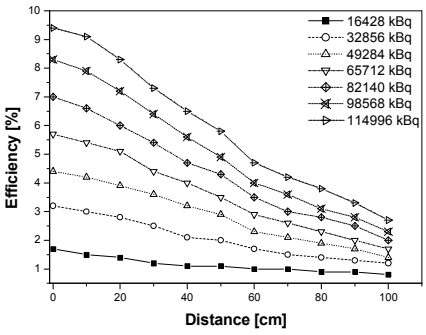
Measured response for a Cs-137 source placed on portable portal monitor

- 'Transition area' is between measured count rates start to dramatically increased and drop off earlier
- It appears that the detector is less efficient in the region near the PMT
  → 0.25~1.5 meters away from the PMT
- Satisfactory agreement with
  G. Takoudis. et. al(2007)
  ⇒ Considering center of vertical direction



Measured efficiency depend on distance from horizontal/vertical direction of portable portal monitor

- Vertical direction(0~2 meters) and horizontal direction(0~0.8 meters) divided length of detector into eight equal sections respectively
- At the middle of the detector
  → efficiency sustained similar level
- Effective Detection Zone
  → Circle of sensitivity (Garry H. Kramer 2006)
  : the radius of the circle of sensitivity to be determined at other activities

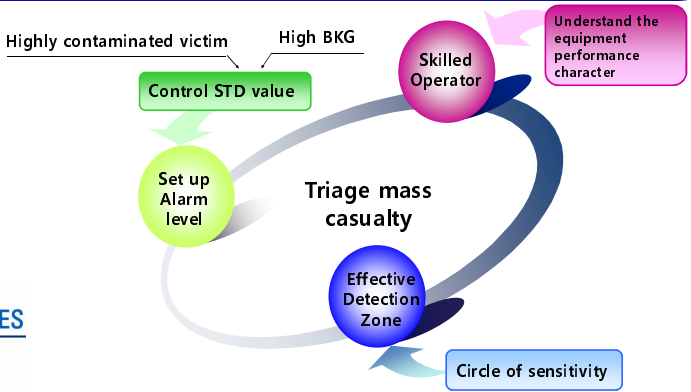


Measured efficiency (activity/distance)

- Efficiency was measured at the effective detection zone changing the radioactivity (16,428~114,996 kBq of Cs-137)
- From the center of detector, the radioactive source was moved up to one meter towards the anterior
- The portable portal monitor's detection efficiency was more influenced by activity than distance

IV. CONCLUSION

- For triage at the radiological mass casualty
  → Considering the effective detection zone
  → Considering high background/highly contaminated victim
  → Operator control the equipment skillfully
  → Modify the STD value



KOREA INSTITUTE OF RADIOLOGICAL & MEDICAL SCIENCES
NATIONAL RADIATION EMERGENCY MEDICAL CENTER