

“A New Monetary Value Model for ALARA Practices in NPPs”

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The ratio of the expense required for ALARA measures versus the collective dose, which can be avoided by those measures, is called α value (Unit: Dollar/man·Sv). ISOE investigated α values in several European countries in 2002. An α value cannot be obtained just by simply dividing the cost by the dose but consideration needs to be given to the gross national production (GNP), mortality, life expectancy, inflation rate, and so on of each nation. KINS (Korea) uses α value calculation model that assumes cost increase in a staircase pattern with the increase of dose. NRPB (England), Kyoto University (Japan), and CEPN (France) have also publicly announced their original α value calculation models.

KINS made case studies including a comparison of α values obtained by inputting Korean conditions into those models and a comparison of α values obtained by inputting conditions of other nations into the KINS model. In addition, KINS proposed a new model to obtain an α value by dividing a basic α value, which is obtained in consideration of the purchasing power parity gross national product (PPP GNI) so that the currency rate and the economic condition of each nation can be well reflected, by a risk aversion coefficient. The α values of Korea, Japan, and the United States calculated by this model at a risk aversion coefficient of 1.4 to 1.7 are 60,000 to 1,300,000, 240,000 to 5,100,000, and 195,000 to 42,500,000 respectively.

New Values evaluated by the use of KINS Model

	Cases	Alpha base Value \$/man-Sv	Alpha Values \$/man-Sv (Aversion Factor per region)		
			₁ (a=1.4)	₂ (a=1.5)	₃ (a=1.7)
Korea	PPP	13,000	60000	267000	1300000
	Current Price	17,000	80000	350000	1700000
Japan	PPP	51,000	240000	105000	5100000
	Current Price	44,000	200000	900000	4400000
China	PPP	205	954	4210	20500
	Current Price	943	4390	19370	94300
Swiss	PPP	79,000	370000	1620000	7900000
	Current Price	59000	275000	1212000	5900000

New Values evaluated by the use of KINS Model

	Cases	Alpha base Value \$/man-Sv	Alpha Values \$/man-Sv (Aversion Factor per region)		
			₁ (a=1.4)	₂ (a=1.5)	₃ (a=1.7)
UK	PPP	43,000	200,000	880,000	43,000,000
	Current Price	38,110	180,000	780,000	38,000,000
USA	PPP	42,000	195,000	860,000	42,500,000
	Current Price	42,000	195,000	860,000	42,500,000
France	PPP	45,000	210,000	920,000	45,000,000
	Current Price	40,000	190,000	820,000	40,000,000
Canada	PPP	41,000	190000	820,000	41,000,000
	Current Price	39,000	180,000	780,000	39,000,000