

# 경기 지역 낙농작업자의 재해 발생 현황과 요인

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## Work-related Injuries in Dairy Farm in Gyeonggi Province

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**Objectives :** Although dairy farming ranks as the industry with the highest injury incidence rate, the information on the injuries is limited in Gyeonggi Province. The purpose of this study was to investigate the occurrence of farm accidents and injuries.

**Methods :** The occurrence of accidents among dairy farmers due to work-related injuries were investigated from 2,799 dairy farms of Seoul Dairy Cooperative. Among 171 total accidents, the number of accidents for human was 108. In this study, the 108 human accidents were investigated.

**Results :** The results of this study were as follows;

First, the injury rate in dairy farming was 1.60%. Second, the highest injury in dairy farm was occurred in the spring and at 6~8 p.m. Third, a variety of injuries occurred when doing the

milking. Fourth, cow, machinery and falls were among the most common causes. Fifth, the most common injuries was fracture (52.8%) and the most common body part of injuries were torso (25.9%), legs (22.2%) and hand (18.5%). Sixth, 45% of the accidents indicated the lost work time from 4 weeks to 3 months.

**Recommendations:** With the results, it is recommended that practical control methods to prevent accidents in dairy farming, for instance, wearing adequate personal protective equipment (PPE) or designing a moderate floor of works etc. be studied and developed.

**Key Words :** injury, accident, dairy farm, human, work-related

## I . 서 론

(WTO)

2004), 가 1995

: 2005 11 17 , : 2006 6 10

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 ( , 1997). ( , 2004)  
 (11.8%) (18.7%)  
 (18.6%)  
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(Rasmussen et al., 2000; Pratt et al., 1992; Virtanen et al., 2003).  
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 ,  
(McCurdy & Carroll, 2000; Rasmussen et al., 2000;  
Browning et al., 1998; Pratt et al., 1992; Brison & Picket, 1991 ),  
TMR  
(Layde et al., 1995)  
(Hartman et al., 2004)  
(Cecchini et al., 2005)  
가  
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가 ,  
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## II. 연구방법

가

가 2,799가 28% 2004 29%,

가 9

가

2003 2004

가

2002 12 2003 11

2003 12

2004 11

2004

SPSS 10.0 Version

### III. 결과

## 1. 낙농작업자의 재해사고 실태

2003 74 , 2004 97 171  
 . , 2003 44 , 2004  
 64 108 , 63%  
 (Table 1).

204 . . . .

가 . 가 2002 12 2004 11 2

, 2003 1.3%, 2004 108

1.6%, 1.45% ( 82 (75.9%) , 19 (19%)

: 2,799 ). 40 (57 , 52.8%)

, 가 가 , 50 (20 , 18.5%), 30

(17 , 15.7%) ,

46 (13~63 ) . 40

27 50%, 49 (18~88 ) . 20 20

(Table 1).

13 , 24 .

## 2. 낙농 작업자의 재해사고 조사 및 분석

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2) - , ,

(30.6%) 가 (26.9%) ,

3 (11.1%), 4 (11.1%), 10 (12.0%)

Table 1. Number of accidents by injured object in dairy farm (Seoul Dairy Cooperative, 2003~2004)

Accidents and injury	Injured object	Number of injuries by year		
		2003	2004	Total(%)
Body injury by working tasks for dairy farmer (only the members of the union)	Human	44 (36)	64 (45)	108 (63)
Injury by livestock with a contagious disease	Animal	5	9	14 (8)
Accident by fire, electric leakage and disaster	Facility	19	24	43(25)
Body injury not related to farm working (Except sports meeting, traffic accidents etc.)	Human	5	0	5 (3)
Other		1	0	1 (1)
Total		74	97	171(100)

Table 2. Number of injuries by season, month and time in dairy farm

Season	n (%)	Month	n (%)	Time	n (%)
Spring	33 (30.6)	January	6 (5.6)	06:00~08:00	16 (14.8)
Summer	25 (23.1)	February	4 (3.7)	08:00~10:00	4 (3.7)
Autumn	29 (26.9)	March	12 (11.1)	10:00~12:00	13 (12.0)
Winter	21 (19.4)	April	12 (11.1)	12:00~14:00	5 (4.6)
		May	9 (8.3)	14:00~16:00	10 (9.3)
		June	10 (9.3)	16:00~18:00	13 (12.0)
		July	8 (7.4)	18:00~20:00	20 (18.5)
		August	7 (6.5)	20:00~06:00	9 (8.3)
		September	8 (7.4)	Unknown	18 (16.7)
		October	13 (12.0)		
		November	8 (7.4)		
		December	11 (10.2)		
Total	108 (100)	Total	108 (100)	Total	108 (100)
p-value	0.632	p-value	0.397	p-value	0.009**

\*\* p<0.01 by  $\chi^2$  test

06~08 (14.8%), 18~20 (18.5%) 가 28.7% 가 (Table 4). STF slips( ), trips( ), falls( ) (Bentley et al., 2003). Bentley (2003) STF 가 (Bentley et al., 2003). 가 (15 , 13.9%), (14 , 13.0%), (13 , 12.0%) (P=0.000). 가 , 가 , 가 가 45 (41.7%) , 23 (21.3%) , 29 (26.9%) (P=0.000) (Table 3). 47가 12가 가 . 5) 가 가 , (28 , 25.9%) 가 가 , (20 , 18.5%) (P=0.000). 가 30 (27.8%) 가 , (21 , 19.4%), (20 , 18.5%) 가 (P=0.007). 가 (21 , 19.4%) (P=0.000) (Table 5).

**Table 3. Number of injuries by working task in dairy farm**

Working tasks	Number of injuries by year				p-value
	2003	2004	Total	(%)	
Cow-related			45	(41.7)	0.000**
Delivery	3	1	4	(3.7)	
Milking	10	16	26	(24.1)	
Moving cows and maintenance	2	8	10	(9.3)	
Exertions disposal	1	4	5	(4.6)	
Farm machine-related (not with cows)			23	(21.3)	
Tractor, cultivator etc.	1	7	8	(7.4)	
Machine repair, building maintenance/construction	8	4	12	(11.1)	
Miscellaneous	0	3	3	(2.8)	
Forage-related			29	(26.9)	
Silage	2	3	5	(4.6)	
Feeding, carrying	5	5	10	(9.3)	
Forage mixture	3	4	7	(6.5)	
Pasture-related (cutting etc.)	4	3	7	(6.5)	
Other			11	(10.2)	
Driving, transportation	4	7	11	(10.2)	
Total	43	65	108	(100)	

\*\* p<0.01 by  $\chi^2$  test

가 가 ~3 가 49 (45.3%) , 4  
34 (31.5%) (P=0.000) (Table 6). Table 6 6

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Table 4. Number of injuries by cause and situation in dairy farm

Injuries by cause and situation	Number of injuries by year				p-value
	2003	2004	Total	(%)	
Cause	43	65	108	(100)	0.007**
Cow	10	20	30	(27.8)	
Tractor, cultivator	3	7	10	(9.3)	
Other machines (TMR, milking machine etc.)	10	11	21	(19.4)	
Truck, vehicle, trailer etc.	7	13	20	(18.5)	
Workshop related (slippery floor etc.)	9	8	17	(15.7)	
Others	4	6	10	(9.3)	
Injury situation	44	64	108	(100)	0.000**
Slips	7	7	14	(13.0)	
Trips / Falls	8	7	15	(13.8)	
Struck by cows	3	3	6	(5.6)	
Kicked by cows	4	9	13	(12.0)	
Stepped on by cows	0	3	3	(2.8)	
Caught in or between cows or machine	3	12	15	(13.9)	
Others and Unknown	19	23	42	(38.9)	

\*\* p<0.01 by  $\chi^2$  test

Table 5. Number of accidents by injured part of body and type of injury

Injured part of body / Type of injury		Number of injuries by year				p-value
		2003	2004	Total	(%)	
Body	Head	5	3	8	(7.4)	0.000**
	Face / Neck	3	7	10	(9.4)	
	Torso	11	17	28	(25.9)	
	Arm	1	3	4	(3.7)	
	Hand, fingers, wrist	8	12	20	(18.5)	
	Legs	7	17	24	(22.2)	
	Foot, toes, ankle	7	6	13	(12.0)	
	Other	1	0	1	(0.9)	
Sub total		43	65	108	(100)	
Type of injury	Cut	1	3	4	(3.7)	0.000**
	Laceration	2	6	8	(7.4)	
	Fracture	28	29	57	(52.8)	
	Abrasion / Bruise	3	6	9	(8.3)	
	Sprain	6	15	21	(19.4)	
	Inflammation, Others / Unknown	3	6	9	(8.3)	
Sub total		43	65	108	(100)	

\*\* p<0.01 by  $\chi^2$  test



가 (26.9%)

Rasussen (2000) 가 16% 가 (PPE, personal protective equipment), NIOSH(1987) 가 (2.8%), TMR 21 가 (Layde, 1995) 가 가 가 가 (, 2002). 가 가 가 (Tisserand, 1985; Haslam & Bentley, 1999), (Ugboko et al., 2002). 가 . STF Bentley (2005) 6 73%, 1 45% 가 43% 43% STF 26.8% . STF 2.4 (, 2004) Allread (2004) , 가 ( , , 가 가 가 가 (Stal, 2000) 가 가 가 가

## V. 결론

2002 12 2,799 2004 11 63% 108 63% 1) 2002 12 2004 11 108 63% 2) 40 가 가 3) , 가 , 3 , 4 , 10 , 12 가 (P>0.05), 6~8 가 가 (P<0.01). 4) 가 가 (P<0.01). 가 가 (P<0.01). 5) , 가 (P<0.01), (P<0.01). 6) 4 ~3 가 (P<0.01). (PPE)

## REFERENCES

- 2004.
- 2002;14(3):315-325
- 2003;30(3):444-460
- . 2004 ( . ). 2004.(320-350 .)
- 1997;24; 61-78
- . 2003 . 2004.
- Allread WG, Wilkins JR, Waters TR, Marras WS. Physical demands and low-back injury risk among children and adolescents working on farms. *J. of Agricultural Safety and Health* 2004;10(4):257-274
- Bentley T, Moore D, Tappin D, Parker R, Ashby L, Legg S et al. Slips, trips and falls in the New Zealand dairy farming sector. COHFE(Center for Human Factors and ERgonomics), Massey University, 2003
- Bentley T, Tappin D, Moore D, Legg S, Ashby L, Parker R. Investigating slips, trips and falls in the New Zealand dairy farming sector. *Ergonomics* 2005;48(8):1008-1019
- Brison RJ, Pickett CW. Nonfatal farm injuries in eastern Ontario: a retrospective survey. *Accid Anal Prev*. 1991;23(6):585-594
- Browning SR, Truszczynska H, Reed D, Mcknight RH. Agricultural injuries among older kentucky farmers:The farm family health and hazard surveillance study. *Am J Ind Med*. 1998;33:341-353
- Cecchini M, Monarca D, Porceddu PR. Workers' safety in milking premises. *J Agric Saf Health* 2005;11(3):293-300
- Cogbill TH, Busch HM. The spectrum of agricultural trauma. *J. Emergency Med*. 1985;3(3):205-210
- Gerberich SG, Gibson RW, French LR, Renier CM, Lee TY, Carr WP, Shutske J. Injuries among children and youth in farm households. *Regional Rural Injury Study-I. Injury prevention* 2001;7(2):117-122
- Hartman E, Frankena K, Vrielink HO, Nielen M, Metz JHM, Huirne RBM. Risk factors associated with sick leave due to work-related injuries in Dutch farmers: an exploratory case-control study. *Safety Science* 2004;42:807-823
- Haslam RA, Bentley TA. Follow-up investigations of slip, trip and fall accidents among postal delivery workers. *Safety Science* 1999;32:33-47
- Layde PM, Nordstrom DL, Stueland D, Brand L, Olson KA. Machine-related occupational injuries in farm residents. *Ann*

- Epidemiol. 1995;5(6):419-426
- McCurdy SA, Carroll DJ. Agricultural injury. *Am J Ind Med.* 2000;38(4):463-480
- Meyers JM, Miles JA, Faucett J, Janowitz I, Tejada DG, Kabashima JN. Ergonomics in agriculture: workplace priority setting in the nursery industry. *AIHA Journal* 1997;58(2):121-126
- Meyers JM, Miles JA, Faucett J, Janowitz I, Tejada DG, Duraj V, Kabashima J, Smith R, Weber E. High risk tasks for musculoskeletal disorders in agricultural field work. *Proceedings of the IEA 2000/HFES 2000 Congress.*
- NIOSH. Guide to international respirator protection US Dept. of health and human services. Pub No. 87116, 1987.
- Pratt DS, Marvel LH, Darrow D, Stallones L, May JJ, Jenkins P. The dangers of dairy farming : the injury experience of 600 workers followed for two years. *Am J Ind Med.* 1992;21(5):637-650
- Rasmussen K, Carstensen O, Lauritsen JM. Incidence of unintentional injuries in farming based on one year of weekly registration in Danish farms. *Am J Ind Med.* 2000;38(1):82-89
- Stal, M. Upper extremity disorders in professional female milkers. *IEA 2000/HFES 2000 Congress Proceedings* 2000.
- Tisserand M. Progress in the prevention of fall caused by slipping. *Ergonomics*, 1985;28:1027-1042
- Ugboko VI, Olasoji HO, Ajike SO, Amole AOD, Ogundipe OT. Facial injuries caused by animals in northern Nigeria. *British Journal of Oral and Maxillofacial Surgery* 2002;40(5):433-437
- Virtanen SV, Notkola V, Luukkonen R, Eskola E, Kurppa K. Work injuries among Finnish farmers : A national register linkage study 1996~1997. *American Journal of Industrial Medicine* 2003;43(3):314-325