Older Loggers Need Synthetic Rope

Dr. John J. Garland, PE,
Affiliate Professor, U. Washington
Consulting Forest Engineer,
Prof. Emeritus, Oregon State University

Who are the workers?

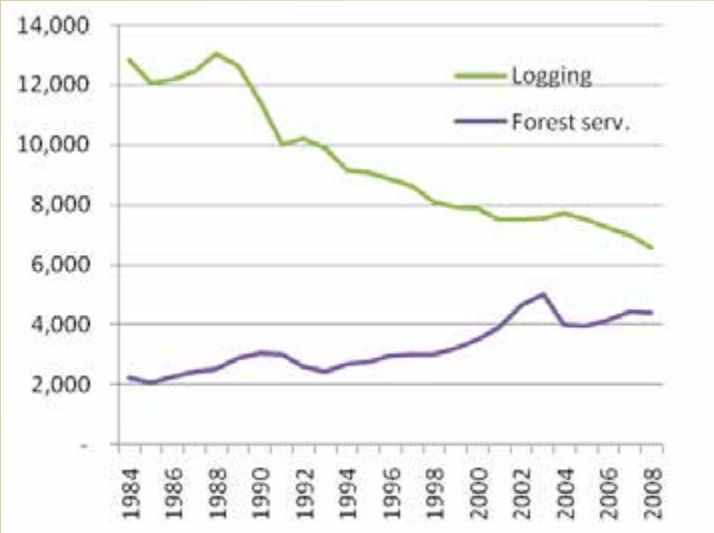
Who are the workers???

National Statistics	Sources	
Worker Categories:	**BLS***	**Census***
Logging	68	83.4 (1997) 69 (2004 CBP)
Forestry Services	12	5 (2004 CBP) 26.5 (1997 CBP)
Support Services	? % of 103	?% of 97.5
Fatal rate calculation	88.7	NI
Truckers/transport	NI	NI
Self Employed	NI	NI
Seasonal workers	NI	NI
Non-wood harvesters	NI	2 (2004 CBP)
Forestry Professionals	NI	NI
Forest Landowners	NI	NI
Logging Firms	NI	13.6 (1997) 11 (2004)
Total Workers (excluding owners & foresters)	**92**	**76**

* Numbers listed in thousands

BLS = Bureau of Labor Statistics
CBP = county business patterns data
NI = not included

OR Employment



Current OR Employment

- 2010 Logging at about 5,000 Workers
- 2010 Forestry Services at about 3,800 Workers
- Expect Logging Employment to add 1500+ Workers as Recovery continues

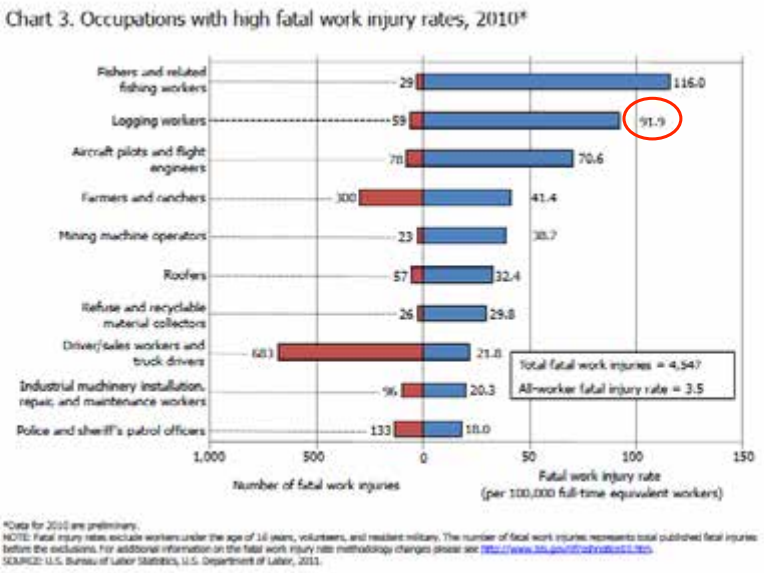
What is happening?

- Workforce is aging
- Workforce is changing
- Workforce may not be available in the future

Logging Jobs

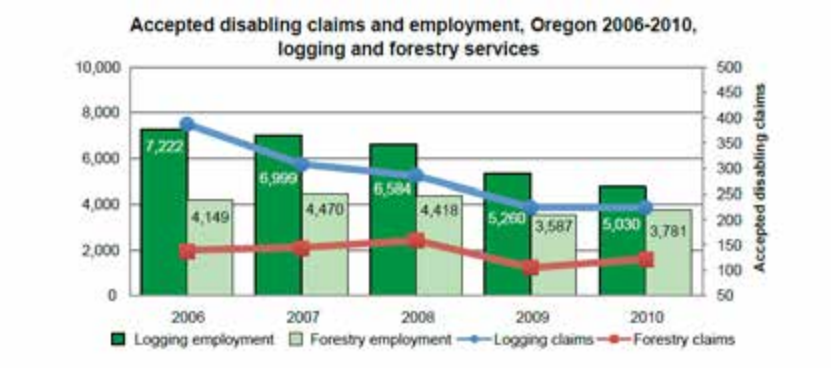
- Jobs that are difficult, dangerous, dirty and declining
- "Lumberjack" ranks as first to third worst job in America
- Safety performance is major reason for perception

Logging jobs most dangerous

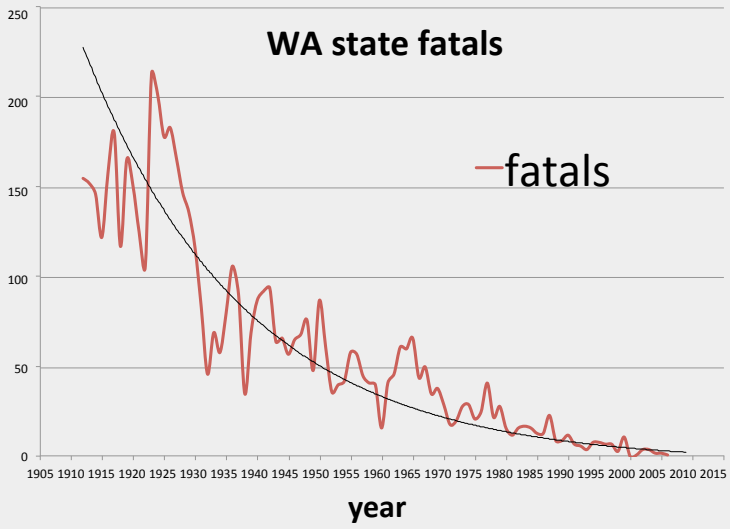


*Data for 2010 are preliminary.
NOTE: Fatal injury rates exclude workers under the age of 16 years, volunteers, and resident military. The number of fatal work injuries represents total published fatal injuries before the exclusions. For additional information on the fatal work injury rate methodology changes please see http://www.bls.gov/iif/oshwc/cfoi1.htm.
SOURCE: U.S. Bureau of Labor Statistics, U.S. Department of Labor, 2011.

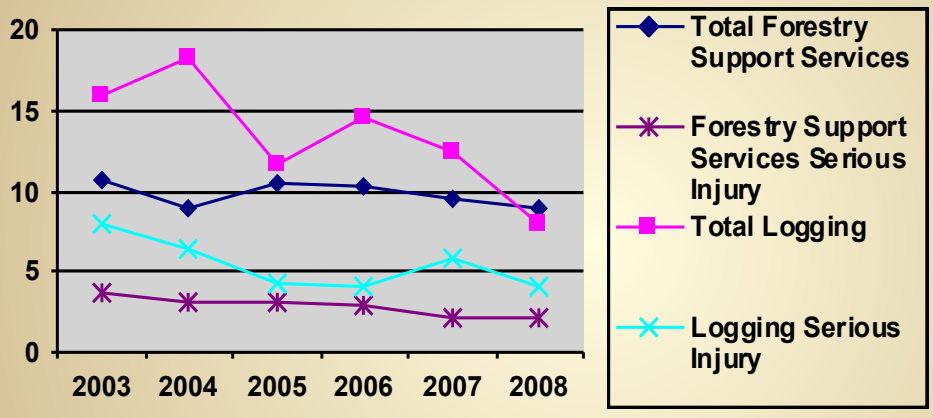
Claims Data



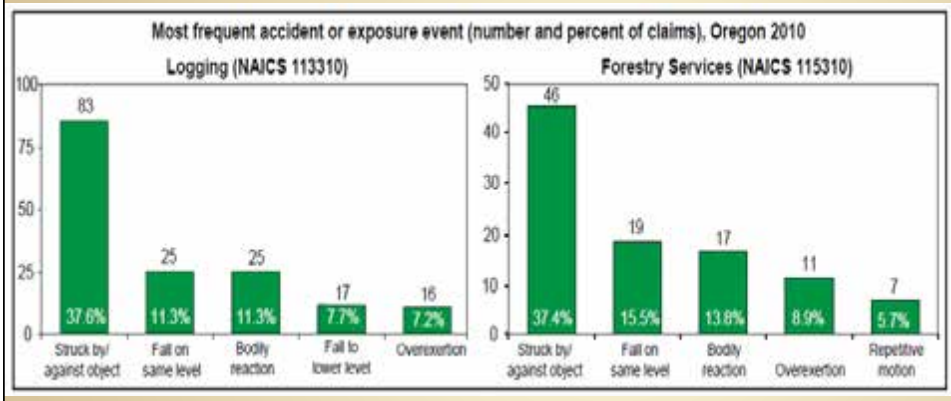
Progress has been made



Washington Total Injuries vs. Serious Injuries



Logging & Forestry Services



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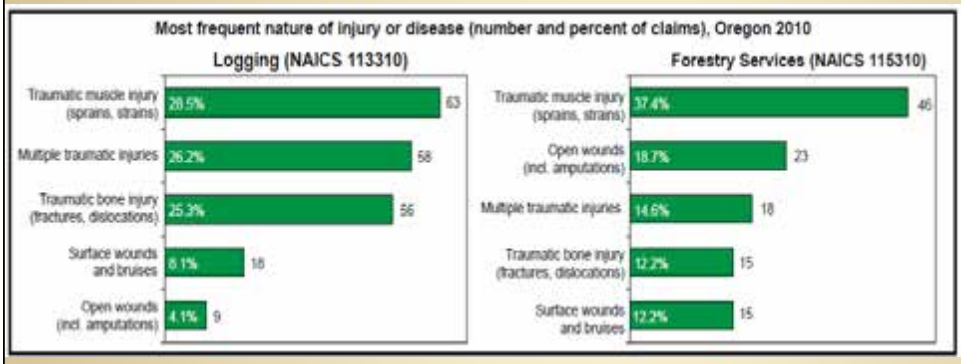
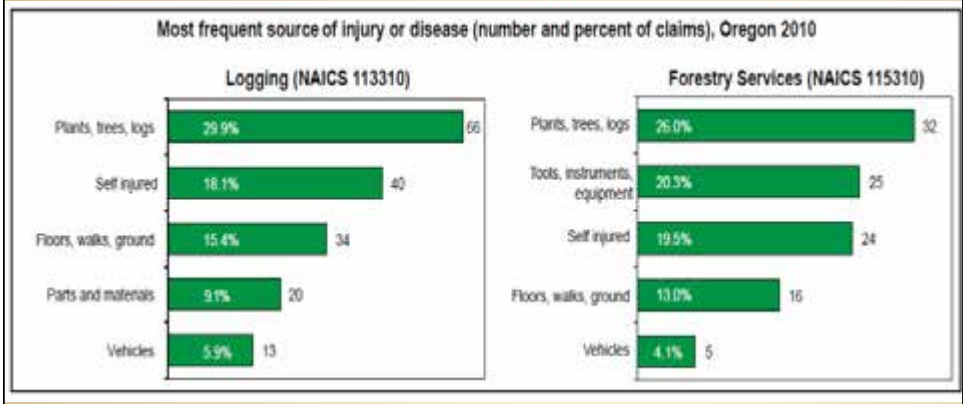


Logging & Forestry Services



Labor Age & Safety at Work

		TOTAL	2000			2001			2002			2003		
			486			457			414			525		
		17 under	2	0.41%		0	0.00%		0	0.00%		0	0.00%	
		18-20	23	4.73%		16	3.50%		19	4.59%		22	4.19%	
		21-25	62	12.76%		57	12.47%		46	11.11%		61	11.62%	
		26-30	67	13.79%		55	12.04%		54	13.04%		62	11.81%	
		31-35	68	13.99%		55	12.04%		69	16.67%		62	11.81%	
		36-40	80	16.46%		73	15.97%		50	12.08%		79	15.05%	
	under 45	41-45	69	14.20%	76.34%	67	14.66%	70.68%	59	14.25%	71.74%	74	14.10%	68.57%
	over 45	46-50	48	9.88%	23.66%	53	11.60%	29.32%	46	11.11%	28.26%	62	11.81%	31.43%
		51-55	29	5.97%		25	5.47%		31	7.49%		51	9.71%	
		56-60	23	4.73%		32	7.00%		21	5.07%		35	6.67%	
		over 61	15	3.09%		24	5.25%		19	4.59%		17	3.24%	
				100.00%			100.00%			100.00%			100.00%	

TOTAL							
17 and under	2	0	0	0	0	2	0.1%
18-20	23	16	19	22	23	103	4.4%
21-25	62	57	46	61	74	300	12.7%
26-30	67	55	54	62	56	294	12.4%
31-35	68	55	69	62	44	298	12.6%
36-40	80	73	50	79	64	346	14.6%
41-45	69	67	59	74	64	333	14.1%
46-50	48	53	46	62	52	261	11.0%
51-55	29	25	31	51	40	176	7.5%
56-60	23	32	21	35	35	146	6.2%
61 and over	15	24	19	17	29	104	4.4%

486	457	414	525	483	2,365	100.0%

Maintain knowledge in aging workforce

- ►Job redesign to accommodate older workers
- ►Use logging technologies to reduce workloads
- ►Differential pay for older workers
- ►Capture knowledge with training/mentoring programs
- ►Specific training responsibility w/pay
- ►Engage older workers for preferences, options,
- ►Part-time, flex-time, job-share, ????

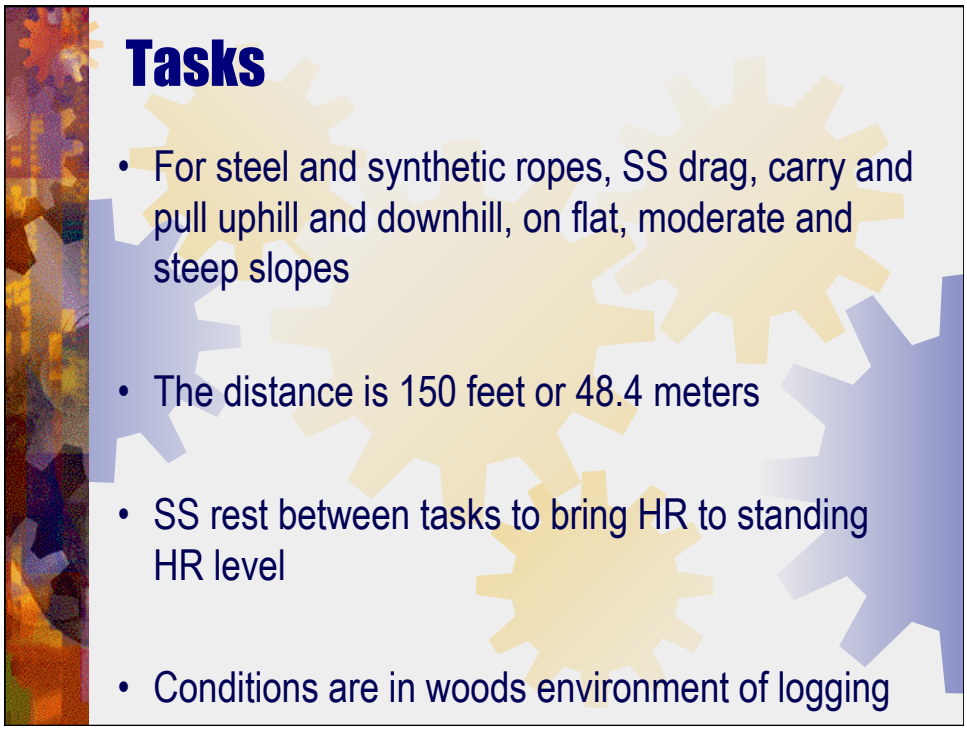
Prior Research with Younger Workers w/synthetic rope

- OSU research on same tasks with younger workers
- For 3 older workers, same site as OSU
- For 1 older worker, 3 repeated measures on same site
- OSU research had 2 older workers
- OSU research had 2 female subjects

Worker	Age	Height (cm)	Mass (kg)	Fitness	Gender
1	23	175	79	good	M
2	21	168	59	good	F
3	25	185	91	good	M
4	23	193	118	good	M
5	38	196	102	good	M
6	22	175	59	good	F
7	47	178	75	good	M
8	46	178	75	good	M
9	23	173	70	good	M
10	21	178	75	good	M
11	38	188	75	excellent	M
12	22	180	75	good	M
13	20	169	70	good	F

Older Worker Characteristics

Worker	Age	Height	Mass	Fitness
20	49	196	114	excellent
21	51	183	84	good
23	62	180	100	excellent
24	43	180	75	excellent
25	43	180	75	excellent
26	60	185	95	excellent
27	46	173	73	excellent



Tasks

- For steel and synthetic ropes, SS drag, carry and pull uphill and downhill, on flat, moderate and steep slopes
- The distance is 150 feet or 48.4 meters
- SS rest between tasks to bring HR to standing HR level
- Conditions are in woods environment of logging

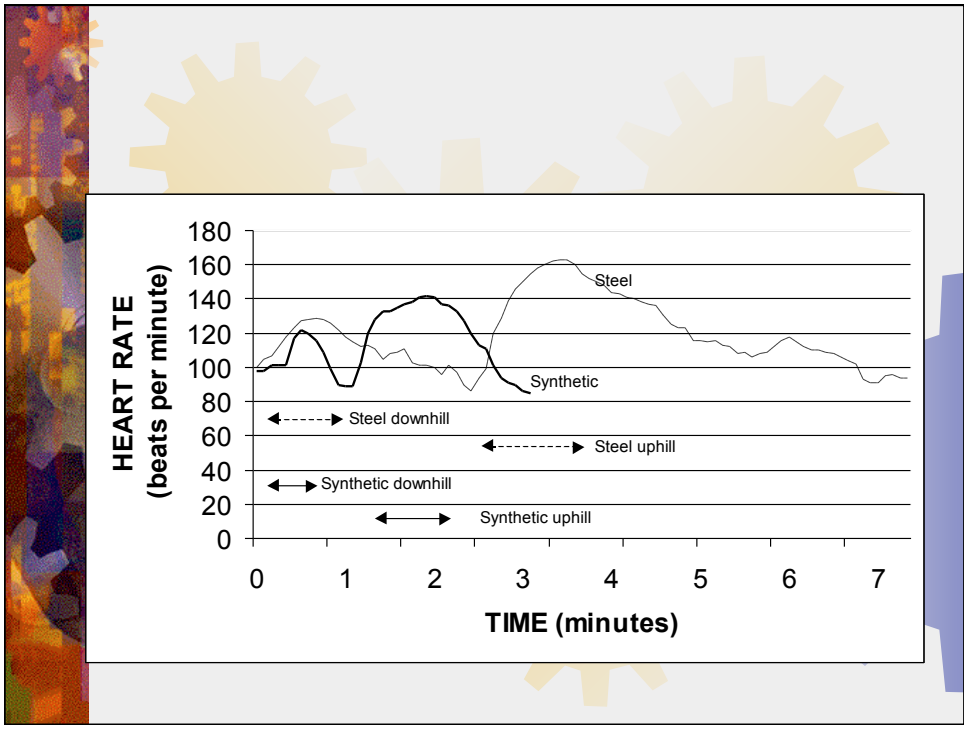
Tasks part of logging

Carrying, Pulling, Dragging

Flat, Moderate, Steep

Measures

- Maximum Heart Rate
- {(HR task – HR rest) / (HR max – HR rest)} x 100% = HR reserve = HRR
- Heart Rate Recovery Rate = HRRR
- Time per Task
- Subjective Assessments



Does synthetic make difference

Task HR	max uphill pull st		Time task	max uphill pull st	
Worker	syn	steel	Worker	syn	steel
20	140	152	20	24	50
21	112	161	21	48	90
23	122	162	23	44	92
24	110	152	24	40	110
25	109	160	25	41	67
26	104	130	26	45	60
27	132	162	27	34	39
mean	118	154	mean	39	73
0.000247Po			0.003552Po		

Does synthetic make difference

Task HR	Mean HR uphill pull st		Task HR	Mean HRR uphill pull st	Task HR	Mean %HRR uphill pull st
Worker	syn	steel	syn	steel	syn	steel
20	140	152	122	138	0.43	0.62
21	112	161	108	146	0.34	0.75
23	122	162	114	133	0.35	0.63
24	110	152	104	139	0.13	0.55
25	109	160	102	146	0.20	0.67
26	104	130	100	126	0.09	0.48
27	132	162	119	144	0.13	0.52
mean	118	154				
0.000247 Po		0.00015 Po		3.03E-05 Po		

Subjective Measures

- SS readily indicated the synthetic rope was much easier than steel save for task where wire rope weight assisted SS, eg, pulling rope downhill on steep terrain
- SS noted they were more “sure-footed” with synthetic rope compared to steel, could reduce slips/falls, strains/sprains

Similar results available for tasks

- Similar results are available for the other tasks of carrying, dragging, pulling on various slopes
- Not all results show significant differences between steel and synthetic rope.
- The pattern of differences is significant as well—where the tasks are not demanding or steel weight helps SS, we expect less difference as in younger worker study

Other project findings

- Efforts to use GPS on sports heart rate monitoring was not successful—lost signals from satellite in forest conditions
- Recession caused several cooperating firms to shut down or cease operations
- Need to have better criteria for “out-of-service” condition for synthetic rope

Continuing Analysis

- Comparison of older versus younger workers on selected tasks
- Translate differences on time per task to economic consequences for logging tasks
- Presentations at logging conferences
- Peer-review and popular publications

Collaborators

- PNASH
- Associated Oregon Loggers and member firms
- Washington Contract Loggers and member firms
- Puget Sound Rope, Anacortes, Washington
- Oregon State University Student Logging Program