Mines Rescue Personnel: The Fitness Component

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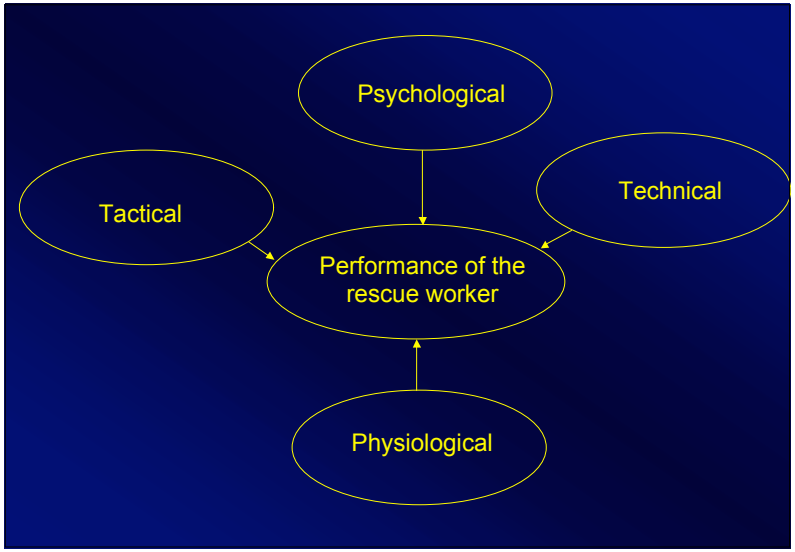
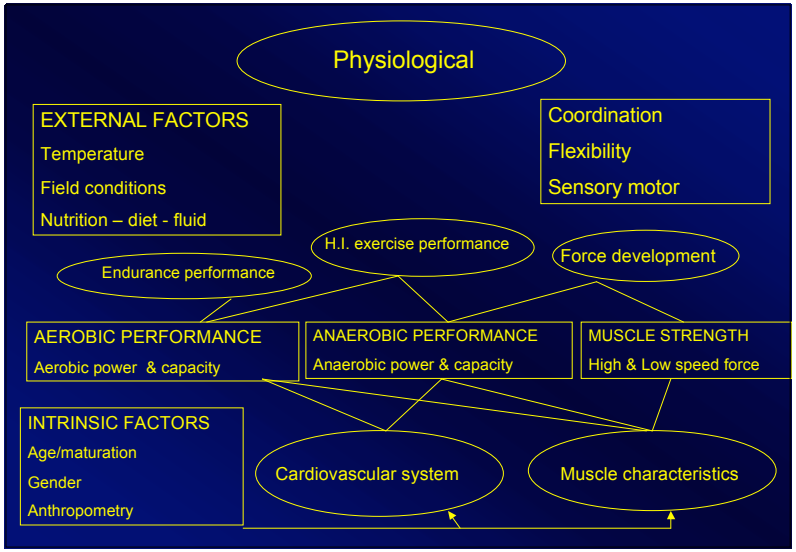




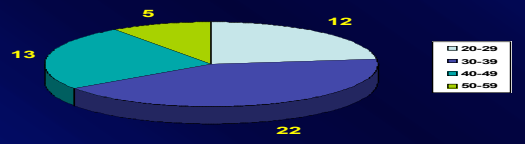
The aims of this present project was to:

- Gather basic physiological data on mine rescue crew individuals
- The initiation of a data base on physiological responses of mine rescue crew individuals
- The development of simulated physiological tests to provide feedback to mine rescue crews

2005 Mines Rescue Challenge

Sample size of 52

Mines Rescue Crew Personnel



Break down of participant number by age category

Resting blood pressure values

Category/age range	All	20-29	30-39	40-49	50-59
Excellent (80 + percentile)					
Above average (60 - 80 percentile)	8	2	4	2	
Average (50 percentile)	21	6	7	6	2
Below average (30 - 50 percentile)	22	5	9	5	3
Poor (< 30 percentile)					

Body mass index (BMI*)

Category/age range	All	20-29	30-39	40-49	50-59
Excellent (80 + percentile)					
Above average (60 - 80 percentile)					
Average (50 percentile)	11	4	3	2	2
Below average (30 - 50 percentile)	17	4	8	4	1
Poor (< 30 percentile)	24	4	11	7	2

* Noted the bias of this measure

Sit and reach

Category/age range	All	20-29	30-39	40-49	50-59
Excellent (80 + percentile)	16	3	6	5	2
Above average (60 - 80 percentile)	12	2	5	4	1
Average (50 percentile)	8	2	5	1	
Below average (30 - 50 percentile)	14	3	6	3	2
Poor (< 30 percentile)	2	2			

Abdominal endurance (sit-ups/min)

Category/age range	All	20-29	30-39	40-49	50-59
Excellent (80 + percentile)	15	1	7	5	2
Above average (60 - 80 percentile)	11	2	4	4	1
Average (50 percentile)	14	6	6	2	
Below average (30 - 50 percentile)	7	3	3		1
Poor (< 30 percentile)	5		2	2	1

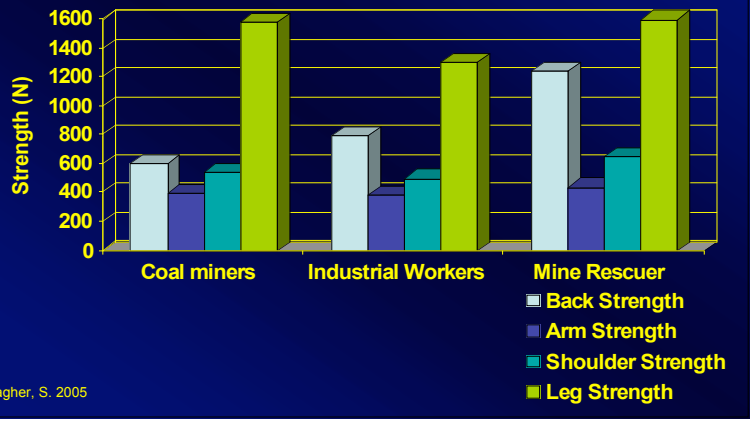
Back Extension muscle endurance (secs)

Category/age range	All	20-29	30-39	40-49	50-59
Excellent (80 + percentile)	6	2	3		1
Above average (60 - 80 percentile)	11	2	4	5	
Average (50 percentile)	10	2	4	2	2
Below average (30 - 50 percentile)	11	3	6	1	1
Poor (< 30 percentile)	12	3	4	5	

Aerobic capacity (Max VO_2)

Category/age range	All	20-29	30-39	40-49	50-59
Excellent (80 + percentile)	14	3	7	2	2
Above average (60 - 80 percentile)	6	1	3	2	
Average (50 percentile)	5	2	1	1	1
Below average (30 - 50 percentile)	12	3	6	3	
Poor (< 30 percentile)	14	3	5	5	1

Comparisons of strength measures for coal miners (confined vertical space) to an industrial population and mine rescue personnel



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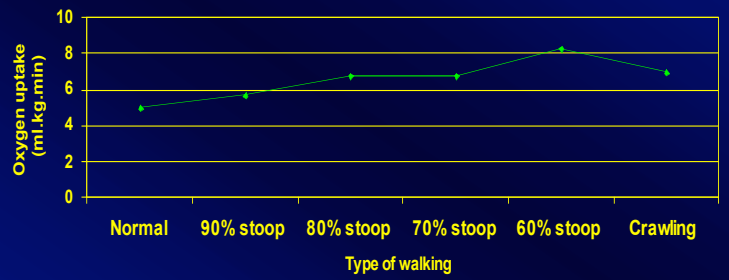
	Subject 1	Subject 2	Subject 3
APMHR	187	185	182
HR	180	183	175

What would be the consequences of prolonged workload at this demand have upon the cardiovascular system?

- The human body is a remarkably adaptable and capable of performance in a wide variety of environments and circumstances
- It cannot be said, however, that the body can perform equally well under all conditions
- In fact, when faced with awkward tasks or environmental demands, the musculoskeletal and cardiovascular systems may endure substantial performance limitations

Physiological cost of erect walking, stoopwalking and crawling



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Summary

- Performance limitations of the rescue worker effected by the following:
  - Biomechanical loads placed upon the body
  - High physiological costs
  - Reduced strength
  - Decreased stability or balance
  - Fatigue

Summary

- Should the rescue personnel be selected with the physiological demands of the task in mind?
- Regular training programs for the technical/tactical components. Why not include the physiological?
- Aging workforce and its' associated complications, the blending of rescue teams for the "cycle of knowledge"

Summary

- Preliminary data from Townsville 2005 Mines Rescue Challenge
- Lack of data for comparison purposes
- Realistic nature of the task to simulate the real world setting (no two rescue are the same)
- Continuing involvement to improve our understanding of the requirements.

Thank you!