

the **CrossFit** JOURNAL ARTICLES

Validity of CrossFit Tested

Greg Glassman

Last year the Royal Canadian Infantry School, CFB Galetown, New Brunswick, Canada, tested the validity of the CrossFit concept against the extant Canadian Army fitness program (AFM).

U.S. and Coalition Forces personnel can contact Coach Greg Glassman (greg@crossfit.com) for more information about the trial or CrossFit implementation, or to contact the Canadian Infantry School CrossFit Cell.

We want to thank the officers of the Canadian Infantry School and Instructors from PSP (Personnel Support Programs) for their incredible professionalism, warm hospitality, and commitment to state-of-the-art military physical training.

The summary and tables that follow were excerpted from the final report of the trial.

Royal Canadian Infantry School Army Fitness Manual/
CrossFit Trial Results

- In March 2005 the Canadian Infantry School was authorized to conduct a physical fitness trial that would test the validity of the CrossFit concept using the AFM as the baseline model.
- CrossFit develops the same aspects of fitness as the AFM - aerobic conditioning, muscular strength/ endurance, flexibility, and power.
- Utilized a different modus operandi than traditional military fitness program.

Testing Protocols

The effectiveness of the two programs was gauged using the following measures:

- Physical testing - PT test and obstacle course
- Student perceptions of the program
- Injury rate during the trial
- Testing was conducted at the beginning and end of PT phase
- One group, DP 1.2, final crse for infantry officer prior to posting to a regiment and assuming command of Platoon, seven weeks of training
- Other group, CAP, 1st Army course for land component officers, eight weeks of training
- Quantifiable success measure was the improvement score between the first and second test.
- Student perceptions were gauged by questionnaire
- Injuries were recorded through CF medical system and course records

PT Test Events

- Sit-ups - max in two minutes
- Vertical Jump - two minutes for two attempts
- Push-ups - max in two minutes
- Deadlift - max reps in two minutes, 2 X 40 lbs dumbbells
- Pull-ups - max reps in one minute
- 2.4 km run - outdoor course

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Validity of CrossFit Tested (continued...)

Obstacle Course Test

- Individual performance for fastest time
- Three attempts per obstacle without one minute penalty
- Dress CADPAT, Kevlar, and gloves
- CAP: 19 obstacles
- DPI.2: 23 obstacles
- Designed to gauge the physical capacities of the students across a wide range of general physical skills.
- Developed by PSP and Inf School
- Used AFM “fitness checks”
- Each test stand supervised by PSP
- Staff evaluated only one test stand to ensure standardization
- Students identified by numbers only

Student Perceptions

- DP 1.2 crse provided input
- Questionnaire conducted after completion of all physical testing
- Purpose was to provide the candidates with an anonymous forum to obtain their feedback, without influence, on the PT program they were utilizing
- General rating scale and open-ended questions were used

Questions

- Program Safety
- Group Cohesion
- Field Applicability
- Field Physical Preparation
- Program Challenge
- Program Enjoyment
- Exercise Difficulty
- Group Applicability
- Ease of Logistics
- Fitness Improvements
- Fitness Program Comparison

Injury Rate

- Important measure of program utility
- Data obtained for Return to Unit (RTU) students
- Must have completed initial PT test
- Injury during PT, or a physical activity in garrison or in the field
- Chronic injuries were assessed as “non-attributable and attributable”
- Any injury not attributed to physical training was not recorded, ie ear injury

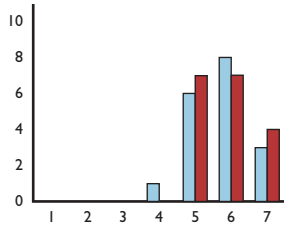
Physical Test Data -- Means

	SIT-UPS		VERTICAL JUMP (cm)		PUSH-UPS		SQUATS		PULL-UPS		2.4 KM RUN (min:sec)		OBSTACLE COURSE (min:sec)	
	AFM	CF	AFM	CF	AFM	CF	AFM	CF	AFM	CF	AFM	CF	AFM	CF
CAP														
Start	61.9	57.6	46.4	42.6	31.9	29.4	43.8	40.3	5.6	4.5	12:32	14:10	7:21	8:33
End	60.9	61.2	45.2	42.2	36	35.1	51.3	55.2	6.2	4.5	11:54	12:33	6:03	7:10
Difference	-1	3.6	-1.2	-0.4	4.1	5.7	7.5	14.9	0.6	0	-0:38	-1:37	-1:18	-1:23
DPI.2														
Start	72.6	71.9	46.5	45.5	41.8	36.1	48.5	48.1	7.4	5	12:24	12:12	11:30	12:37
End	74.9	78.1	47.1	44.8	45.4	43.1	54.2	61.2	8.7	6.9	11:24	11:10	10:37	11:22
Difference	2.3	6.2	0.6	-0.7	3.6	7	5.7	13.1	1.3	1.9	-1:00	-1:02	-0:53	-1:15

Validity of CrossFit Tested (continued...)

Program Safety:

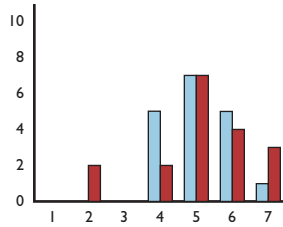
I feel the training I participated in was safe.



1 = very strongly disagree 4 = neutral 7 = very strongly agree vertical scale = number of people

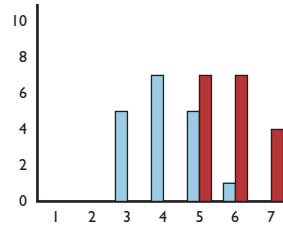
Group Cohesion:

I feel the cohesion of my platoon was increased during the physical training sessions



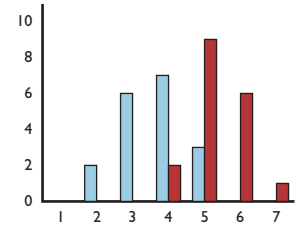
Field Applicability:

I feel the activities performed during the physical training sessions were related to the types of tasks performed in a field environment



Field Physical Preparation:

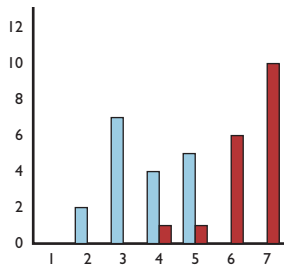
I feel the physical training sessions prepared me for the field



AFM CrossFit

Program Challenge:

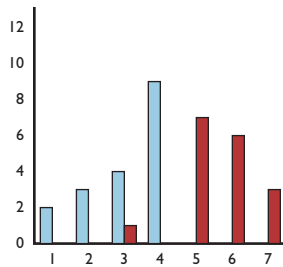
The physical training sessions were challenging



1 = very strongly disagree 4 = neutral 7 = very strongly agree vertical scale = number of people

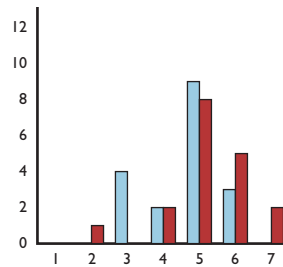
Program Enjoyment:

I enjoyed performing the physical training sessions



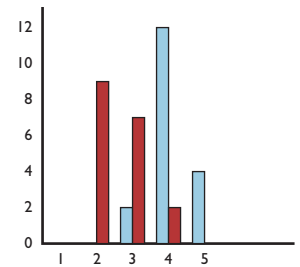
Group Applicability:

This training is useful as a group oriented physical training program



Exercise Difficulty:

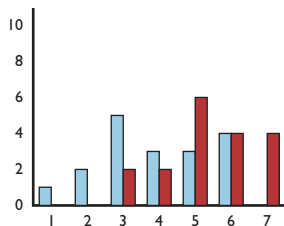
The movements in this program were difficult/easy to learn



1 = very difficult 3 = neutral 5 = very easy

Ease of Logistics:

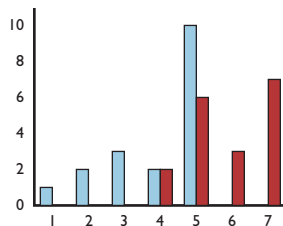
Logistically, this program is realistic for army group physical training sessions



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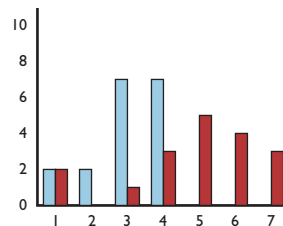
Fitness Improvement:

I am in better physical condition now than at the start of the physical training program



Fitness Program Comparison:

I have achieved greater physical fitness gains using this program than with other programs I have used in the past



AFM CrossFit

Validity of CrossFit Tested (continued...)

AFM Program

- Conducted IAW the “12 week Army Fitness Program”
- Workouts included warm up, exercise (40-50 min), and cool down
- Supervised by course instructor
- Workouts consisted of:
 - Aerobic intervals
 - Continuous aerobic training
 - Strength and power training
- Optional day (weight-load marching, sports, or make up day)

CrossFit Program

- Based on *CrossFit Journal* and CrossFit site
- Workouts included warm up, exercises (15-25 min), and cool down
- Remainder of workout either used for skill instruction, external object movement, or body control
- Supervised by course instructor
- Workouts consisted of:
 - Skill training (weightlifting or bodycontrol)
 - Single skill training (MAT, O-lifting, weight load marching)
 - Multiple skill training (run, weight, body control)

Summary of Statistical Analysis

- Data suggests that CrossFit induced greater leg and core strength
- CrossFit induced equal or greater cardiovascular improvements while performing less than half the running
- In no exercise did the CrossFit groups show less significant improvement than the AFM groups

Explanation of Results

Results suggest CrossFit groups either matched or outperformed the AFM groups

Injury Results and Analysis

- AFM 6 Attributable injuries
- CrossFit 2 Attributable injuries

Possible Bias

- Requirement to have CrossFit certified instructor conduct training as well as serving as Trial Officer

To mitigate the possible bias:

- PT testing was jointly developed by CFB Gagetown PSP Staff
- PT testing was supervised by PSP staff
- Events for the PT test were the AFM fitness checks (bias in favor of the AFM)
- Obstacle course was not an advantage to either group
- Neither group was tested on a CrossFit workout
- Data was collected, entered, processed by a third party

Conclusion

- The CrossFit group made equal or greater strength gains than the AFM with shorter workouts
- The CrossFit group obtained equal the aerobic gains while performing less than half the running
- The increased education level of the CrossFit instructors assisted in the performance of the CrossFit group

Greg Glassman is the founder (with Lauren Glassman) of [CrossFit, Inc.](http://www.crossfit.com) and the publisher of the *CrossFit Journal*.