

VALIDATION OF THE U.S. NAVY FLEET DIVER PHYSICAL SCREENING TEST

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INTRODUCTION: Although work performed by U.S. Navy fleet divers has often been characterized as physically demanding, there is no evidence that the current entry-level physical screening test for divers (500-yd swim, push-ups, sit-ups, pull-ups, and 1.5-mile run) is based on the physical demands of the job. Based on objective work-site measurements and an extensive analysis of survey, interview, and videotape data, a job performance assessment battery (JAB) representative of divers' work has been developed (1). The objective of the present investigation was to determine the relationship between performance on the current U.S. Navy fleet diver physical screening test and the JAB. Matching diver selection and training procedures to the physical demands of the job ensures a high level of operational readiness by enhancing screening, work productivity, and safety.

METHODS: Subjects were 146 male diver candidates (age 25.1 ± 4.3 yr, $\bar{X} \pm$ SD, range 18-37 yr) undergoing training at the Naval Diving and Salvage Training Center, Panama City, FL. Only subjects who met current entry-level physical screening test standards were tested. Since candidates generally perform to minimum standards on the first physical screening test, scores presented here represent performance on the second screening test which is a maximal effort. Due to schedule conflicts, medical waivers, attrition, etc., a number of individuals who completed the initial body composition assessment, did not complete the second physical screening test and all job tasks. Performance on both the physical screening test and the JAB, described below, was measured.

(1) **Tool-Bag Swim** - SCUBA diver (wearing twin 80s, breathing air) swims a distance of 200 ft while carrying a 24-lb tool bag. Scored as pass/fail.

(2) **Fin-Kick** - SCUBA diver (wearing twin 80s) attempts to remain on the surface by fin-kicking for a period of 5 min. Scored as pass/fail.

(3) **Ladder Climb** - MK-21 diver (fully weighted, single SCUBA, breathing air) descends/ascends a 14-ft vertical ladder. Scored as time to complete.

(4) **SCUBA Bottle Carry** - Diver lifts/carries twin 80 SCUBA bottles a distance of 450 ft. (including up/down ship's ladder). Scored as time to complete.

(5) **Umbilical Pull** - Topside diver pulls an umbilical line (weighted to 100 lbs) a distance of 50 ft. Scored as time to complete.

RESULTS: A comparison of physical screening test scores for candidates who passed/failed the two in-water tasks (No. 1 and 2 described above) can be found in Tables 1 and 2. Physical screening test scores of candidates passing the in-water tasks were significantly higher than those of task failures in only one instance (push-up for the fin-kick task, $P < 0.05$, Table 2).

A finding of particular operational significance was that a substantial number of diver candidates who passed current physical screening test standards were unable to complete (i.e., failed) the tool-bag swim (18.5%) and fin-kick (25.7%) tasks.

Multiple regression analyses showed physical screening test scores were not significantly related to shipboard task performance (Tasks 3, 4, 5).

Table 1. Comparison of Physical Screening Test Scores For Candidates **Passing/Failing** Tool-Bag Swim Task

	PASS GROUP (N=53)*		FAIL GROUP (N= 12)		T
	MEAN	S.D.	MEAN	S.D.	
500-yd Swim (min)	10.0	± 1.0	10.4	± 1.2	1.2
Push-Ups	63.0	± 10.1	61.2	± 15.3	-0.5
Sit-ups	74.7	± 4.1	72.7	± 16.0	-0.4
Pull-ups	11.8	± 3.1	12.0	± 4.3	0.1
1.5-mile Run (min)	9.8	± 0.7	10.2	± 0.8	1.6

None of the group differences **was** significant
T=Pooled Variances T
*N=52 (500-yd Swim), 51 (1.5-mile Run)

Table 2. Comparison of Physical Screening Test Scores for Candidates **Passing/Failing** Fin-Kick Task

	PASS GROUP (N=49)**		FAIL GROUP (N= 17)		T
	MEAN	S.D.	MEAN	S.D.	
500-yd Swim (min)	10.0	± 1.1	10.3	± 1.0	-1.1
Push-Ups	64.8	± 11.7	57.9	± 8.0	2.2*
Sit-ups	76.3	± 14.4	68.9	± 12.0	1.9
Pull-ups	12.2	± 3.3	10.6	± 3.0	1.7
1.5-mile Run (min)	9.8	± 0.8	10.2	± 0.6	-1.6

*Significant Group Difference (P<0.05 level)
T=Pooled Variances T
**N=48 (500-yd Swim, 1.5-mile Run)

1. The use of realistic diving tasks conducted in a field setting appears to be a valid approach for measuring diver job performance.
2. Current physical screening test criteria do not accurately reflect the physical demands of the job.
3. Validation of **an** experimental fitness battery may provide the basis for establishing improved physical selection criteria for the U.S. Navy Fleet Diving Program.

REFERENCES:

1. Marcinik E.J., Schibly B.A., Hyde D., and Doubt T.J. 1993, **An** analysis of physically demanding tasks performed by U.S. Navy Fleet Divers, Naval Medical Research Institute Report No. 93-15.

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