Cleaning Up a Custodial Hiring Mess: A Competency-Based Approach

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Presentation Overview

- Origins of a Hiring Mess
- Cleaning Up the Mess
- In Search of Competencies
- Development of a New Assessment
- Selection Utility and Validity
- Operational Impact
- Organizational Benefits

T & E (Rating Schedule)

- Unassembled examination
- Written demonstration of KSAs
- Writing not part of job
- Labor-intensive to score
- Received 40,000 applications per year

Self-Assessment

- Well-designed predictive study (Ocasio, 1983)
- Applicants completed self-ratings of ability
- Evaluated by supervisors after 3-month period
- Self-ratings highly inflated despite threat of verification
- Zero or negative correlations at the item level
- Overall validity: Pearson r = -.07

Following Oral Directions Test

- Content validated exercises
- High reliability (Alpha in the .80s, Test-Retest in the .90s)
- Limited variability, elevated pass rate
- Undermined by “test substitution” policy
- Test waived for displaced mail sorters

Change in Nature of the Work

- Variety of new building materials, power equipment, chemical cleaners
- Exposure to chemical, electrical, and biological hazards
- Increase in safety mishaps
- OSHA training requirements
- Functional literacy (product instructions, MSDS)
- Complaints of poor selection quality

Custodial Maintenance Employees

- Maintain a clean, healthy, safe work environment
- Represent 40% of entire maintenance workforce
- Potential source for filling skilled building maintenance positions
- Any improvement in selection quality will have huge ROI (*N* = 16,484)

Job Analysis

- Site visits, interviews, job observations
- Development of task and competency lists
- Nationwide job analysis survey
- Identification of critical competencies needed upon entry
- Tasks linked to critical competencies

Test Development

- Selection strategy linking assessments to competencies
- Identify test content domains/sub-areas
- Item writing workshops
- Multiple series generation
- Develop scoring procedure

Custodial Maintenance Battery

- Basic Industrial Safety
- General Cleaning/Disinfecting
- Read/Comprehend Written Materials
- Follow Written Instructions
- Total of 60 items – 15 per section

Basic Industrial Safety

- Personal protective equipment
- Electrical, chemical, biological hazards
- Sanitation
- Ladder safety
- Working from heights
- Lifting, materials handling

General Cleaning/Disinfecting

- Interior: Workrooms, lobbies, restrooms
- Exterior: Building, grounds
- Proper use of tools, equipment, materials
- Floor maintenance

Read/Interpret Written Material

- Custodial terminology/vocabulary
- Paragraph comprehension

Source of the Reading Materials:

- Product label instructions/warnings
- Equipment operating instructions
- MSDS/HAZMAT training materials
- Cleaning route sheets

Follow Written Instructions

- Understand and execute simple instructions
- Carry out work order requests
- Follow cleaning route sheets
- Basic reasoning

Validation Research

- Content validation study
- Develop criterion-related validation strategy
- Conduct nationwide criterion-related study
- Estimate empirical validity
- Estimate selection utility (cost savings)

Operational Data

- Preliminary applicant data
- Demographic analysis
- Adverse impact

Organizational Benefits

- High face validity/applicant acceptance
- High empirical validity and selection utility
- No adverse impact
- Perception of professionalism
- Dispels myth that “anyone can do this work”
- Enhances internal recruitment for higher level skilled positions

Questions & Answers

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Abstract

This presentation summarizes the findings of a three-year study designed to improve the selection quality of custodial maintenance employees in the U.S. Postal Service. We describe the development of a new custodial maintenance battery (CMB) based on an occupational analysis of critical competencies. We conclude with an overview of research findings assessing the validity of the CMB with respect to item content and the prediction of job performance.

Need for new selection procedures. Custodial employees in the Postal Service play a critical role in maintaining a safe, clean, and healthy environment for both employees and customers. Over the years, maintenance managers reported steady erosion in the selection quality of these employees. The potential impact on maintenance operations was staggering given that custodians (N = 16,484) represent over 40% of the maintenance workforce. Over a 30-year period, the Postal Service had used various measurement methods such as a self-assessment, a T&E evaluation, and a simple oral exam. However, scores from these measures all showed limited variability and low predictive value. In 1999, a major effort was undertaken to overhaul the custodial maintenance selection system.

Development of a competency-based approach. The process began with a comprehensive job analysis. We worked closely with maintenance job experts to define exactly what tasks are performed in custodial positions and what worker competencies are needed to carry out these tasks. The job analysis involved site visits, job observations, interviews, and service-wide survey studies involving several hundred maintenance employees, supervisors, and managers.

These studies identified several core competencies needed to learn and perform custodial procedures and methods. Among these were knowledge of basic safety, knowledge of general cleaning/disinfecting, the ability to read training and other written materials, and the ability to follow written instructions. Panels of job experts were convened to write test items designed to measure these critical competencies. The items were used to construct a new Custodial Maintenance Battery (CMB).

Validation Research. We conducted a series of studies to ensure that the new Custodial Maintenance Battery (CMB) was valid with respect to item content and predictive efficacy. Item-competency linkages provided by job experts were highly significant as measured by various indices of interrater agreement (e.g., r_{WG}, Lawshe's Content Validity Index, proportion of endorsement).

A criterion-related study using a nationwide sample of custodial maintenance employees (n = 77) showed that the CMB was highly correlated with supervisory ratings of job performance (r = .44, p < .0001). When corrected for range restriction, the operational validity for job applicants was estimated to be .59. Using a standard economic gain formula, we estimated the cost savings for one cohort of new hires over the course of their custodial maintenance careers to be $133 million.

TABLE 1. *COMPETENCY-BY-ASSESSMENT MATRIX*

Competency	Import.	Needed Upon Entry	Written Exam	Inter-view	Medical Assess	Training
Follow Oral Instructions	X	X		X		
Follow Written Instructions	X	X	X			
Industrial Safety	X	X	X			
Reading Written Material	X	X	X			
Cleaning and Disinfecting	X	X	X			
Best Order of Cleaning Tasks	X					X
Operate Power-Driven Equipment	X					X
Maintain Tools & Equipment	X					X
Furniture Moving Techniques	X					X
Stand, Stoop, Bend & Stretch	X	X			X	
Lift/Carry 45 lbs. or more	X	X			X	
Work at Heights	X	X		X	X	
Basic Arithmetic						

TABLE 2. ***CUSTODIAL MAINTENANCE BATTERY: CONTENT VALIDITY INDICES***

Version	P_e	*CVI*	$r^*_{WG(J)}$
Series 001	.93	.86	.96
Series 002	.95	.89	.97
Series 003	.99	.99	.97

Note*:* P_e = average proportion of item endorsement. *CVI* = Lawshe's content validity index. $r^*_{WG(J)}$ = average agreement that test (scale) is content valid. All indices significant at $p \leq .05$.

TABLE 3. ***CUSTODIAL MAINTENANCE BATTERY: VALIDITY COEFFICIENTS***

Criterion	Test Score	Tenure
Overall Job Performance	.44**	-.15
Quality of Work	.39**	-.16
Quantity of Work	.36**	-.18
Work Method	.29**	-.10
Org. Citizenship	.22 *	-.01

Note*: *p ≤ .05; **p ≤ .01*

TABLE 4. ***CUSTODIAL MAINTENANCE BATTERY: UTILITY ANALYSIS***

$$U = r_{xy} * SD_y * Z_x * N * T - Costs$$

Where: Equals:

U	Productivity in dollars resulting from use of new test
r_{xy}	Correlation between test scores and job performance (.59)
SD_y	Standard deviation of the dollar value of output (40% of average annual salary)
Z_x	Average test score for those hired in standard score form: ([59.4 – 51.7]/8.15)
N	Number of annual accessions (Avg. between 1993 and 2001: 2,500)
T	Average tenure (6.6 years)
$Costs$	Cost of administering test (16,000 applicants per year times $1.00)

$$U = (.59 * \$14{,}598 * .94 * 2{,}500 * 6.6) - \$16{,}000$$

$$U = \$133{,}568{,}838$$

NOTE: This is the utility for one cohort over their custodial maintenance careers.

TABLE 5. *CUSTODIAL MAINTENANCE BATTERY: DEMOGRAPHIC ANALYSIS*

DEMOGRAPHIC CATEGORY		TEST RESULTS				
		Mean	SD	%Pass	Total N	Table %
AGE	Below 40	50.86	8.19	92.6%	8,540	32.6%
	40 and Above	52.21	7.98	93.9%	17,660	67.4%
RACE[1]	Black	50.13	7.65	92.9%	9,855	43.5%
	Hispanic	48.02	9.31	86.5%	2,782	12.3%
	White	55.42	4.93	98.7%	8,298	36.6%
SEX	Female	47.43	9.97	84.9%	3,587	15.7%
	Male	52.15	7.57	94.4%	19,299	84.3%
ELIGIBILITY	No	29.08	7.22	0.0%	1,748	6.6%
	Yes	53.35	5.24	100.0%	24,680	93.4%
EXAM TYPE	Entrance	51.26	8.31	92.6%	23,023	87.1%
	In-service	54.98	5.40	98.4%	3,405	12.9%
EXAM SERIES	001	52.51	8.06	94.2%	7,790	29.5%
	002	52.20	7.94	93.8%	9,999	37.8%
	003	50.52	8.16	92.2%	8,639	32.7%
VETERAN'S PREFERENCE	Non-Veterans	49.40	9.68	88.3%	11,741	44.4%
	Veterans	53.61	5.92	97.5%	14,687	55.6%

[1] Data for other groups (e.g., American Indian, Alaskan Native, Asian, Pacific Islander) not reported due to small numbers.

Bios

Stephen Salyards joined OPM in April 2002 after working for the U.S. Postal Service for 19 years as a research psychologist. He has extensive experience in developing employee selection systems and conducting test validation research. He has a B.S. in applied psychology from Virginia Commonwealth University and an M.A. in I/O psychology from George Washington University.

Shirley Plunkett received an M.A. in I/O Psychology from George Mason University, and has been employed by the U. S. Postal Service as a psychologist in the selection and evaluation group for the past 8 years. Her responsibilities include research and projects for the development and validation of both paper and pencil, and computer-based selection and promotion examinations. One of Shirley's major contributions has been the development of the Postal Service's interviewer's training, which was developed and implemented as the postal service's first web-based training program and is mandatory training for selecting managers.