APPLYING
APPA Guidelines
for Custodial Staffing
THE CASE OF SLIPPERY ROCK UNIVERSITY

Slippery Rock University (SRU) was founded in 1889. It is a state university with 8,500 students and 400 faculty. Facilities and Planning (F&P) employs 178 staff, of which 50 are custodians. F&P is responsible for the maintenance of 560 acres and 60 major buildings that comprise approximately 2.3 million gross square feet.

Currently work is assigned to the custodians, by two custodial supervisors, who use their 25 years of work experience at the university to determine the workload for the custodians. No standards, calculations, or other scientific methods are applied in this process.

The main goal of our recent research and analysis project was to evaluate the current staffing assignments and to provide a general picture of the custodial needs and the current level of cleanliness at SRU. SRU's goal is to maintain an aggregate Level 2 cleanliness in its buildings. Level 2 is defined as "ordinary tidiness" and includes "shiny floors and base moldings and no buildup in corners or along walls, vertical and horizontal surfaces are clean but may contain dust and fingerprints upon close inspection, lights and fixtures work, and washroom and shower fixtures gleam and are odor-free." (APPA Guidelines)

The project started with data collection in two phases: (1) taking an accurate cleanable space inventory of all buildings at SRU and (2) performing the cleaning audits. The process of data collection and analyses lasted for nine months, from September 2008 through May 2009.

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PHASE 1 - CLEANABLE SPACE INVENTORY

All buildings cleaned by F&P at SRU were measured by hand using the original blueprints as guidelines. All spaces were also classified into different categories following the APPA *Custodial Staffing Guidelines for Educational Facilities, second edition*, e.g., "classroom hard floor," "classroom carpet floor," and so on. After the categorization was completed we used the Staffing Service Levels provided by the APPA Guidelines to determine the workload for each floor. We used the floor as a unit of analysis because the current work assignments are typically by floor, i.e., each floor is assigned to one custodian, although one custodian could be responsible for several floors in different buildings. The cleanable space inventory allowed us to determine the staffing requirements per building and the current workload per custodian.

PHASE 2 - CLEANLINESS AUDITS

We decided to audit four random spaces from each floor that were used more regularly. For example, for a classroom building we chose a classroom, a washroom, an entranceway, and an office on each floor. We developed audit sheets for different spaces, where we weighted different elements in the space differently.

Based on the four audits per floor, we calculated the average level of cleanliness per floor as an average from the four audits. We were also able to calculate the average level of cleanliness per building by averaging the levels for each floor. Since each floor was assigned to a specific custodian we were also able to calculate the average level of cleanliness per custodian.

RESULTS

The analysis revealed that SRU was understaffed for Level 2; there were 69.71 custodians required, but only 50 available. At the same time the average level of cleanliness was 1.87 (Level 1 being the highest), which was a surprising result. The reason for this result is there are other factors that impacted the audit results, and are discussed in the last section of this article.

CUSTODIAN PERFORMANCE

We calculated the current workload and the average level of

Custodian Initials*	Workload index	Cleanliness index	Workload group	Cleanliness group	Recommendation
AA	0.75	1.50	LOW	HIGH	INCREASE WORKLOAD
AB	0.70	1.83	LOW	ADEQ	INCREASE WORKLOAD
AC	1.56	1.84	HIGH	ADEQ	NO CHANGE
AD	1.09	2.08	ADEQ	ADEQ	NO CHANGE
AE	1.14	1.87	ADEQ	ADEQ	NO CHANGE
AF	2.38	2.50	VERY HIGH	LOW	REDUCE WORKLOAD
AG	1.40	2.00	ADEQ	ADEQ	NO CHANGE
AH	1.26	2.13	ADEQ	ADEQ	NO CHANGE
AI	2.07	1.95	VERY HIGH	ADEQ	PROVIDE REWARD
AJ	0.99	2.04	ADEQ	ADEQ	NO CHANGE
AK	1.57	1.60	HIGH	HIGH	PROVIDE REWARD
AL	1.26	1.38	ADEQ	HIGH	PROVIDE REWARD
AM	0.48	1.13	VERY LOW	HIGH	INCREASE WORKLOAD
AN	1.89	1.59	HIGH	HIGH	PROVIDE REWARD
AO	0.49	1.14	VERY LOW	HIGH	INCREASE WORKLOAD
AP	0.77	1.79	LOW	ADEQ	INCREASE WORKLOAD
AQ	1.96	2.57	HIGH	LOW	REDUCE WORKLOAD
AR	2.35		VERY HIGH		PERFORM AUDIT
AS	0.73	1.72	LOW	ADEQ	INCREASE WORKLOAD
AT	3.06	1.72	VERY HIGH	ADEQ	PROVIDE REWARD
AU	2.83	1.85	VERY HIGH	ADEQ	PROVIDE REWARD
AV	1.40	2.00	ADEQ	ADEQ	NO CHANGE
AW	0.77	1.39	LOW	HIGH	INCREASE WORKLOAD
AX	2.07		VERY HIGH		PERFORM AUDIT

*Disguised
Table 1. Workload and level of cleanliness per custodian and the recommended human resource strategy with the results from the analyses for Slippery Rock University
(50 custodians total, 4 with outstanding audits)

cleanliness for each custodian. The workload was not normally distributed but skewed towards 1.00 with the majority of custodians assigned workloads higher than 1.00. The workload ranged between 0.48 and 3.45. Ideally the workload should be 1.00, but we expect to have some variability in the work assignments. It is important to determine accurately the acceptable ranges for the workload. In our case we decided to make the adequate range of workload, 0.8 to 1.5, as the majority of the workload assignments fell within this category.

Similarly, we categorized the level of cleanliness into three categories. The average level of cleanliness was 1.87 with a standard deviation of 0.51. It was not normally distributed, but skewed towards 2.0 with the majority of observations falling between Level 1 and Level 2. We decided that a level between 1.0

> **AUDITS ARE ALSO CLOSELY RELATED TO THE TRAINING OF THE CUSTODIANS AND IF YOU CHANGE THE WAY YOU AUDIT, YOU INEVITABLY NEED TO CHANGE THE WAY YOU TRAIN THE CUSTODIANS**

and 1.7 would be considered a high level of cleanliness, between 1.7 and 2.3 an adequate level, and between 2.3 and 5.0 a low level. Again, these cutoffs pertain to SRU only and other schools may decide to have different cutoffs.

Next, we classified each custodian into different groups based on his/her current workload and current level of cleanliness (Table 1). Finally, we recommended a generic human resource strategy for each group. For example, if the workload is very low and the level of cleanliness adequate or high, then the recommendation was to increase the workload for this custodian. Table 2 presents the 15 groups and the corresponding strategies for each group. It also presents the aggregated results for the SRU custodians. These results show that for 17 custodians no change in the assignment is required, for 14 custodians we need

Custodian Initials*	Workload index	Cleanliness index	Workload group	Cleanliness group	Recommendation
AY	1.41	3.57	ADEQ	LOW	PROVIDE TRAINING
AZ	1.23	1.40	ADEQ	HIGH	PROVIDE REWARD
BA	0.87	1.93	ADEQ	ADEQ	NO CHANGE
BB	0.82	3.10	ADEQ	LOW	PROVIDE TRAINING
BC	2.35		VERY HIGH		PERFORM AUDIT
BD	0.90	2.00	ADEQ	ADEQ	NO CHANGE
BE	1.65	2.30	HIGH	ADEQ	NO CHANGE
BF	0.49	1.14	VERY LOW	HIGH	INCREASE WORKLOAD
BG	1.29	2.25	ADEQ	ADEQ	NO CHANGE
BH	1.24	2.00	ADEQ	ADEQ	NO CHANGE
BI	1.38	2.29	ADEQ	ADEQ	NO CHANGE
BJ	2.07		VERY HIGH		PERFORM AUDIT
BK	1.83	1.81	HIGH	ADEQ	NO CHANGE
BL	0.70	1.83	LOW	ADEQ	INCREASE WORKLOAD
BM	0.77	1.28	LOW	HIGH	INCREASE WORKLOAD
BN	1.34	2.83	ADEQ	LOW	PROVIDE TRAINING
BO	0.77	1.39	LOW	HIGH	INCREASE WORKLOAD
BP	1.88	1.54	HIGH	HIGH	PROVIDE REWARD
BQ	0.77	1.28	LOW	HIGH	INCREASE WORKLOAD
BR	1.49	2.27	ADEQ	ADEQ	NO CHANGE
BS	0.77	1.22	LOW	HIGH	INCREASE WORKLOAD
BT	1.12	2.14	ADEQ	ADEQ	NO CHANGE
BU	0.48	1.13	VERY LOW	HIGH	INCREASE WORKLOAD
BV	3.45	1.86	VERY HIGH	ADEQ	PROVIDE REWARD
BW	2.10	1.95	VERY HIGH	ADEQ	PROVIDE REWARD
BX	1.57	1.80	HIGH	ADEQ	NO CHANGE

to increase the workload, for 2 custodians we need to decrease the workload, for 3 custodians we need to provide training, and for 10 custodians, if possible, we need to provide a reward for their outstanding performance.

PRACTICAL IMPLICATIONS

Performing the audits was the most critical element in the process. It was also the most challenging, because even though the APPA Guidelines provides examples of performing audits, it is up to each school to develop its own audit sheets and audit procedures. We were trying to balance the frequency and the level of detail of the audits with the limited resources available. Audits are also closely related to the training of the custodians and if you change the way you audit, you inevitably need to change the way you train the custodians.

> WE STRONGLY BELIEVE THAT THE CUSTODIAL SERVICES AT SRU AND AT ANY OTHER SCHOOL WILL BENEFIT GREATLY FROM TRYING TO APPLY THE APPA GUIDELINES.

Many factors impacted the outcome of the audits. Since it is difficult to create a structured procedure that will take into consideration all of the factors, we recommend starting with the APPA Guidelines and modifying them based upon school specific standards and the expertise of the school's custodial supervision. Over the course of the project we found a number of factors that were not addressed in the APPA Guidelines for

which we had to make modifications. Listed below are some of the considerations and factors with which we had to deal with, in our project. Other schools going through the same process will need to make similar decisions.

CONSIDERATIONS FOR THE AUDITS

1. The level of cleanliness depends highly on the age of the building. The newer buildings are much easier to clean than old ones. This should be a consideration when assigning work.
2. The level of cleanliness depends on the usage of the building/space. For example, if the Football Stadium is not used regularly, you may need fewer employees than the number provided by the APPA Guidelines.
3. The level of cleanliness depends on the number of people that use the space. Spaces that are used by fewer people (for example an office) have higher level of cleanliness than spaces used by many people (for example classrooms or bathrooms).
4. The level of cleanliness depends highly on the time of audit. For example if you audit in the afternoon it will be more "dirty" than if you audit in the morning. At SRU, the custodians work 6:00 a.m.- 2:00 p.m. with the majority of

REPORT TOTALS FOR ALL THE BUILDINGS SURVEYED FOR THE OPERATION CLASS

BUILDING	FLOOR	CODE	SPACE	SQ. FT	CUSTODIAL INITIALS	CURRENT LEVEL	APPA 2	Required # people for
BUILDING1	1ST	CCF	Classroom - Carpet	1,960	AA	2	21700	0.090322581
BUILDING1	1ST	FHF	Cafeteria - Hard Floor	608	AA	2	16400	0.037073171
BUILDING1	1ST	LCF	Library - Carpet	60	AA	2	36900	0.001626016
BUILDING1	1ST	LCF	Library - Carpet	1,131	AA	2	36900	0.030650407
BUILDING1	1ST	LCF	Library - Carpet	13,343	AA	3	36900	0.361598916
BUILDING1	1ST	OCF	Office - Carpet	988	AA	2	18200	0.054285714
BUILDING1	1ST	OCF	Office - Carpet	1,056	AA	2	18200	0.058021978
BUILDING1	1ST	OCF	Office - Carpet	1,178	AA	2	18200	0.064725275
BUILDING1	1ST	PCF	P.C. - Carpet	1,244	AA	3	40400	0.030792079
BUILDING1	1ST	PHF	P.C. - Hard Floor	85	AA	3	20500	0.004146341
BUILDING1	1ST	PHF	P.C. - Hard Floor	1,470	AA	2	20500	0.071707317
BUILDING1	1ST	STO	Store Room	60	AA	2	210000	0.000285714
BUILDING1	1ST	VEN	Vending	657	AA	2	11100	0.059189189
BUILDING1	1ST	WAS	Washroom	60	AA	2	2600	0.023076923
BUILDING1	1ST	WASHU	Washroom - High Use	357	AA	2	1300	0.274615385
BUILDING1	1ST	WASHU	Washroom - High Use	420	AA	2	1300	0.323076923
BUILDING1	2ND	CCF	Classroom - Carpet	578	AB	3	21700	0.026635945
BUILDING1	2ND	CCF	Classroom - Carpet	700	AB	3	21700	0.032258065
BUILDING1	2ND	CCF	Classroom - Carpet	1,000	AB	3	21700	0.046082949
BUILDING1	2ND	CCF	Classroom - Carpet	1,091	AB	3	21700	0.050276498
BUILDING1	2ND	LCF	Library - Carpet	9,504	AB	3	36900	0.257560976
BUILDING1	2ND	OCF	Office - Carpet	98	AB	2.5	18200	0.005384615
BUILDING1	2ND	OCF	Office - Carpet	225	AB	2.5	18200	0.012362637
BUILDING1	2ND	OCF	Office - Carpet	290	AB	2.5	18200	0.015934066
BUILDING1	2ND	OCF	Office - Carpet	300	AB	2.5	18200	0.016483516
BUILDING1	2ND	OCF	Office - Carpet	399	AB	2.5	18200	0.021923077

Figure 2. Part of the Excel spreadsheet with the collected data

public area being cleaned prior to 8 a.m.

5. The level of cleanliness depends highly on the season when it is performed. During winter time, the buildings are "dirtier" due to the snow and rain that is tracked in by the building occupants.

6. The level of cleanliness may be impacted by the number of people assigned to clean one floor. If more than one person is assigned to a floor/area, we found the area had a lower the level of cleanliness if specific responsibilities were not provided.

7. When more than one person is assigned on one floor, we also assume the workload is evenly distributed between the people and that they can clean at the same level and with the same speed. At SRU we found that this wasn't always the case.

8. The level of cleanliness appears to depend on the experience of the custodian. At SRU, we tended to find that the higher the level of experience, the higher the level of cleanliness.

9. When determining the current level of cleanliness, all buildings/floors/spaces were given the same weight. For example we gave the same weight to a classroom as to an office. Different schools may wish to put different weights on different space types and buildings. Currently the APPA Guidelines do not provide any recommendations for weighting space types.

FACTORS THAT IMPACTED OUR PROJECT

1. Length of the work day. The guidelines assume an 8-hour work day, while SRU has a 7.5-hour work day.

2. How often should audits be performed (once a year, twice a year, twice per month)? How much space should be regularly audited (15%, 25% of the total space) and what space types (classrooms, offices, washrooms, lockers)?

3. How to weight the different spaces? For example, do you want to have the same weight for a classroom as for an office, or a washroom?

4. How to weight different elements in the audit of one space? For example, when you audit a classroom, do you place the same weight on the floor as on the air vents?

5. How to take into consideration productivity improvements from new cleaning equipment and chemicals.

6. How to determine the ranges for adequate workload? For example, do you want to have a range between 0.8 and 1.2 or a range between 0.9 and 1.1?

7. How to determine the ranges for adequate cleanliness? For example, do you want to have a range between 1.8 and 2.2 or a range between 1.9 and 2.1?

8. How to determine the training needs? Besides the standard training provided to the custodians, the supervisors at SRU created a video on how the audits are performed. When custodians watch the video and know how the audits are performed they will know how and what exactly to clean.

9. What is a good way to reward people for outstanding performance? Reward does not always have to be monetary. There are many articles and books on rewarding people. Some simple rules are: reward for long-term performance not short-term, reward individuals not teams, and personalize the reward.

In conclusion we found the whole experience extremely helpful and a great learning exercise. Collecting data and identifying the trends in the data was very insightful for the custodial supervisors. We strongly believe that the Custodial Services at SRU and at any other school will benefit greatly from trying to apply the APPA Guidelines. The guidelines themselves may not provide direct answers to all operations questions, but they definitely initiate the cycle of performance measurement, quality control, and continuous improvement.

	Very low workload (< 0.5)	Low workload (0.5 – 0.8)	Adequate workload (0.8 – 1.5)	High workload (1.5 – 2.0)	Very high workload (>2.0)
Low cleanliness (2.3 – 5.0)	Provide training N = 0	Provide training N = 0	Provide training N = 3	Reduce workload N = 1	Reduce workload N = 1
Adequate cleanliness (1.7 – 2.3)	Increase workload N = 0	Increase workload N = 4	No change required N = 13	No change required N = 4	Provide reward N = 5
High cleanliness (1.0 – 1.7)	Increase workload N = 4	Increase workload N = 6	Provide reward N = 2	Provide reward N = 3	Provide reward N = 0

Table. 2. Number of custodians in each category for Slippery Rock University

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