A Novel Approach For A More Efficient Mopping System

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ABSTRACT

Keeping an animal facility clean is a time consuming and expensive endeavor, both in terms of product cost and labor costs to execute. Bioexclusion continues to be extremely important to a well run animal facility thus Standard Operating Procedures have become more stringent, increasing staff time spent to perform this task. In addition, industry wide, there is a global effort to "Go Green" and be conscientious of the amount of chemicals and water that are being sent down the drain. This poster addresses the steps taken at one institution to evaluate and ultimately implement a new mopping system in an effort to decrease labor time, decrease chemical and water usage, while maintaining bioexclusion requirements.

BACKGROUND and SIGNIFICANCE

The Office of Laboratory Animal Resources (OLAR) at the University of Colorado Denver has two 50,000 square foot animal facilities. In 2010 the institution underwent a large scale decontamination and rederivation effort and instituted strict bioexclusion SOP's, including twice per day floor mopping, in an effort to keep the facility specific pathogen free. This extensive mopping not only resulted in significant staff time, but also used more than 880 gallons of concentrated quaternary cleaning solutions per year on surfaces including floors and walls. In an effort to decrease labor and chemical costs while maintaining effective bioexclusion procedures, we evaluated floor cleaning SOP's, the tools that were utilized, and the amount of chemical that was being used, to try to determine alternate methods of performing this task.

When the evaluation started, OLAR's SOP for floor mopping involved the utilization of traditional string mops and wringer-style buckets. The mop heads were used in the same area for one week and then sent to laundry. Frequency of mopping occurred two times per day, per area, at approximately 30 minutes of labor time per mopping event or 1 hour of labor time per area per day (including the time to fill the bucket with diluted chemical, mop the floor, empty the bucket, rinse the mop and bucket, and hang the mop). Twenty areas were identified as needing this level of sanitation.

Original Mopping System:
String mop and wringer-style bucket system (above).

MATERIALS AND METHODS

Step 1: Three systems were identified as possible alternatives to the SOP to help meet the objectives of decreased labor time, decreased chemical usage and decreased water usage.

Step 2: After determining the best system to meet the objectives, determine if the proposed system would maintain strict bioexclusion requirements and calculate start up costs.

Proposed Systems

Alternative 1: A microfiber string-mop head utilizing traditional wringer-style bucket. Each mop head was washed every 7 days.

Alternative 2: A "double" mop bucket system utilizing the same microfiber string mop head as used in alternative one. One side of the bucket contained the diluted chemical and the other side was to catch the dirty water.

Alternative 3: A pre-treated single-use microfiber mop head "Flat Mop" cleaning system and a telescoping, dexterous mop handle. Each mop head held a standard amount of liquid, the mop heads were not wrung out prior to use. When diluted chemical was no longer being applied, a new head was snapped into place until the task was completed. Mop heads were washed after each use.

RESULTS

Step 1 Results: Determining the ideal alternative mop system

Alternative 1: The same mop buckets had to be filled (no reduction in chemical and water use) and the mop head had to be rinsed and re-saturated several times during the mopping process. The microfiber head was heavy and difficult to maneuver because of the volume of water that it held. Least expensive option for start-up of the three alternatives. Not chosen to proceed to step 2.

Alternative 2: The dual buckets used the same amount of chemical with more water use. Buckets were heavy and difficult to maneuver. The dirty mop head was contaminating the clean chemical water. The start-up cost of the dual buckets and mops was the most expensive of the three alternatives. Not chosen to proceed to step 2.

Alternative 3: Used only the volume of water and chemical required to fully saturate mop heads resulting in a decrease in chemical and water use. Up to 20 mop heads could be pre-soaked, decreasing labor time. Mop heads were easy to manipulate. Met all three objectives for Step 1, therefore, chosen to move to Step 2 evaluation.

Step 2 Results: Evaluation of Bioexclusion Requirements and Start-up costs

Samples were collected from housing suite floors and incubated for 72 hours on RODAC plates. Floors were subject to research and staff traffic throughout the day, as well as equipment traffic.

BACTERIOLOGICAL RESULTS
String Mop System
Mopping Frequency Two Times Per Day

	Date Sample Collected	Time Sample Collected	CFU After 24h Incubation	CFU After 72h Incubation
Sample Area A Housing Suite Floor	7/12/2011	10:00 AM	13	TNTC
	7/12/2011	1:30 PM	5	TNTC
	7/12/2011	3:00 PM	12	TNTC
	7/13/2011	8:30 AM	1	TNTC

CFU = Colony Forming Units
TNTC = CFUs Too Numerous To Count
NG = No Growth

The old mopping system (string mop with a mop bucket) resulted in high CFU's on a RODAC plate, even with twice per day mopping.

BACTERIOLOGICAL CONTROLS

	Date Sample Collected	Time Sample Collected	CFU After 24h Incubation	CFU After 72h Incubation
Negative Control	8/29/2011	10:00 AM	NG	NG
Positive Control	8/29/2011	10:00 AM	10	20+

CFU = Colony Forming Units
TNTC = CFUs Too Numerous To Count
NG = No Growth

Controls were performed to ensure accuracy.

BACTERIOLOGICAL RESULTS
Flat Mop System
Mopping Frequency Twice Per Day

	Date Sample Collected	Time Sample Collected	CFU After 24h Incubation	CFU After 72h Incubation
Sample Area B Housing Suite Floor	8/22/2012	10:00 AM	NG	NG
	8/22/2012	1:30 PM	NG	2
	8/22/2012	3:00 PM	NG	2
	8/23/2012	8:30 AM	NG	NG
Sample Area C Housing Suite Floor	8/29/2012	10:00 AM	NG	NG
	8/29/2012	1:30 PM	NG	2
	8/29/2012	3:00 PM	NG	NG
	8/30/2012	8:30 AM	NG	NG

Mopping Frequency Once Per Day

	Date Sample Collected	Time Sample Collected	CFU After 24h Incubation	CFU After 72h Incubation
Sample Area D Housing Suite Floor	10/24/2012	7:30 AM	NG	8
	10/24/2012	9:45 AM	2	2
	10/24/2012	4:00 PM	1	1

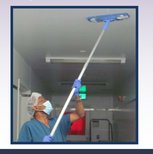
CFU = Colony Forming Units
TNTC = CFUs Too Numerous To Count
NG = No Growth

Low to no CFU's, via RODAC testing using the Flat Mop System, was attained with a mopping frequency of twice per day, which led us to evaluate once per day mopping.

CONCLUSIONS

After working with alternative 3, the results of the bacteriological samples indicated that not only could the institution switch to this new method, but that mopping could be decreased to only once per day, resulting in additional labor savings while still maintaining the departments' bioexclusion program. This was because the cross-contamination of mop water did not occur and the mop heads were cleaned after each use. Ultimately, the decrease in mopping to once per day combined with the decrease in time associated with filling mop buckets, wringing mop heads and rinsing buckets, significantly decreased labor time. The efficiencies found in using the new mop system reduced the amount of labor time spent from one hour to 15 minutes per area per day. The identification and efficiency of the new mopping system resulted in dramatic cost savings in labor time, chemical and water usage for a total yearly savings of $116,395.91. The start-up cost of converting to the new mopping system was $3,153.70. Therefore, the total amount saved in the first year was $113,242.21.

Additionally, the mop system was tried on the walls, ceilings and fixtures and worked remarkably well. The dexterity of the handle allows for easy maneuverability over-head and around obstacles. As a result, this system was also implemented for use on the walls, ceilings and fixtures, saving the department additional labor time and costs.



COST

- Start-up price for the microfiber system: $62.06 per system.
  - Mop buckets $25.34
  - Telescoping handle $9.70
  - Mop frame $19.37
  - Mop pads $7.65
- One mop head cleans approximately 154 square feet of space. Mop head is replaced when chemical is no longer evenly applied to floor.
- Additional mop heads are necessary for providing change-outs for those that are in the laundry.

COST SAVINGS

	Labor Time hours/year	Labor Costs $27.70/hour	Concentrated Chemical Use gallons/year	Concentrated Chemical Cost $13.52/gallon	Water Usage gallons/year[1]
Original String Mop System	5,200	$144,040.00	672	$9,085.44	43,056
Alternative 3 Mop System	1,300	$36,010.00	53.22	$719.53	2,262
SAVINGS	3,900	$108,030.00	619	$8,365.91	40,794

[1] water usage accounts only for actual mopping procedures, no other cleaning processes

STAFF COMMENTS

"I really like that there is no need for wringing and they can be used on floors/ceilings. It's like swiffering on steroids!!!"

"It's easier, lighter, faster, gets into corners, under equipment and into small spaces –it's even easily rotated for access behind and around equipment."

"I no longer need to waste time dipping, dunking and sloshing to try to 'clean' a soiled mop in a bucket full of floaters."

"In a pinch you can even pull the mop head off its handle and use it as a rag, saving a trip to the clean supply area."

Occupational Health Providers who saw the system commented on the improved ergonomics. They appreciated that the system eliminates the lifting and dumping of buckets of water, the wringing of mop heads and how much lighter the system is.

PRODUCT INFORMATION

Pre-Treated Microfiber Cleaning System
from
Creative Products International
www.creativeidea.net

ABSTRACT

A Novel Approach to a Mopping System to Reduce Labor and Product Costs and Decrease Chemical Usage

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Keeping an animal facility clean is a time consuming and expensive endeavor, both in terms of product and labor cost to execute. We are facing a turbulent economic climate where research funding is being cut. As bioexclusion continues to be extremely important to a well-run animal facility, cleaning standard operating procedures (SOP) have become more stringent, requiring more staff time in addition to a global effort to go "green" by being conscientious of the amount of chemicals that we are sending down the drain. As a result of this environment, the Office of Laboratory Animal Resources at our institution evaluated our cleaning SOP, the tools we were using, and the amount of chemical that was being used to determine alternate methods that would allow us to remain effective with our cleaning regiment while reducing labor time and product usage. We determined that yearly usage of chemicals for cleaning the floor were in excess of 880 gal split between 2 50,000-ft2 facilities. Technician time for cleaning corridor, procedural, and housing room floors averaged 60 min per technician per day, as mopping occurred twice per day, under existing procedures. We evaluated different mopping systems and noted labor time, chemical usage, and effectiveness (cultures using contact plates). We were able to find a system that allowed us to decrease the amount of times that our floors were being mopped to one time per day based on the floor cultures. The change in mopping to one time per day combined with the change in the mop system used, allowed our department to decrease the average time that each technician spent on mopping from 60 min to 15 min/d which saved an average yearly cost of $14,458.50 in labor. The new mopping system also decreased our usage of chemicals by 32%, which equates to a yearly cost savings of $3,718.00. In total we saw a yearly savings of $18,176.50. The total start-up cost of materials was $2,473.80. This presentation will discuss how our department evaluated and implemented a novel mopping system which has ultimately saved us significant labor time and decreased our chemical usage without compromising high standards of sanitation.