24 Ensure Toilets & Sinks Work Without Power

I. Summary

Issue:
Some toilets and faucets need electricity to function. This presents a sanitation risk during an extended power outage.

Recommendation:
Require that toilets and faucets be capable of operating without grid power.

II. Proposed Legislation, Rule or Study

***Amendments to the New York City Plumbing Code*:**

1. Add a new subsection 424.7 as follows:

   424.7 Lavatory sensor control devices. In each bathroom, one or more sensor control devices used for lavatory faucets shall be able to continue normal operation in the event of a loss of building electrical power for a period of at least two weeks, without connection to the building electrical power supply. Exception: This requirement shall not apply to a lavatory faucet that is designed to be operated manually and without electrical power.

2. Add a new subsection 425.5 as follows:

   425.5 Water closet and urinal flushing sensor control devices. In each bathroom, one or more sensor control devices used for flushing toilets or urinals shall be able to continue normal operation in the event of a loss of building electrical power for a period of at least two weeks, without connection to the building electrical power supply. Exception: This requirement shall not apply to a toilet or urinal that is designed to be operated manually and without electrical power.

III. Supporting Information

Expanded Issue and Benefits:

Automatic bathroom fixtures were created in part to reduce human contact with bathroom surfaces that might spread disease. However, the need of many such fixtures for electricity leaves them vulnerable to disruptions in the power grid, potentially crippling building sanitation during blackouts. The effect of losing sanitation in an occupied building was graphically demonstrated in the aftermath of Hurricane Sandy when lack of water pressure caused toilets to fail. This proposal is intended to promote sanitary conditions by ensuring the proper functioning of automatic bathroom fixtures during prolonged power disruptions.

This proposal does not recommend the elimination of power-activated bathroom fixtures because these fixtures provide important health and conservation benefits. The purpose is rather to ensure that these devices can function in the event of utility loss.

In order to minimize required expenses in existing buildings, this proposal does not suggest retroactive application. However, retrofitting at least one toilet and faucet per bathroom is considered a best practice in existing buildings to maintain the use of sanitary facilities during an extended power outage.

Implementation:

Lavatory faucet sensors and toilet sensors with the required battery life are readily available. Some flushometer toilets with sensors also provide a manual override. There should not be any implementation problems with these devices as they are currently required to be installed by a licensed plumber and installation of these devices has been common for years. Devices must have a true manual override that allows the device to be operated in the complete absence of external power, not a button that still requires electricity supply to the device for it to function.

Cost:

Turner Construction Company prepared cost estimates based upon several standardized building typologies. Due to the innate variances in construction costs between projects, the complexity of the Task Force proposals, and the wide range of buildings to which the proposals may apply, these cost estimations should only be used as rough order-of-magnitude guides. The cost analysis is presented at the end of this proposal; more information about the cost methodology is given at the end of the full report.

The following analysis was provided by the authors of this proposal:

The cost of using battery-powered devices rather than hard-wired ones is minimal. There is a potential maintenance cost associated with the changing of batteries in battery-powered devices. However, since true manual override devices are available, as well as battery-powered devices with batteries lasting up to 10 years, the maintenance expenses are very low or zero.

NEW CONSTRUCTION

	Commercial High Rise				Commercial Low Rise				Residential High Rise				Residential Low Rise			
	Quantity	Unit	Unit Cost	Total	Quantity	Unit	Unit Cost	Total	Quantity	Unit	Unit Cost	Total	Quantity	Unit	Unit Cost	Total
24.1 Ensure Toilets & Sinks Work Without Power																
Battery Powered																
Premium for 1 battery powered flushometer per unit									175	EA	$0.00	$0				
Premium for 1 battery powered faucet per unit									175	EA	$200.00	$35,000				
Premium for 1 battery powered flushometers per gang bathroom	60	EA	$0.00	$0	4	EA	$0.00	$0				N/A				
Premium for 1 battery powered urinal flushometers per gang bathroom	30	EA	$0.00	$0	2	EA	$0.00	$0				N/A				
Premium for 1 battery powered faucet per gang bathroom	60	EA	$200.00	$12,000	4	EA	$200.00	$800				N/A				
Remediation of old electric-only fixtures			Not Required				Not Required				Not Required					
SUBTOTAL DIRECT WORK				$12,000				$800				$35,000				
Contingency		**10%**		**$1,200**		**10%**		**$80**		**10%**		**$3,500**				
SUBTOTAL				$13,200				$880				$38,500				
GC Mark-ups		**0.2**		**$2,640**		**0.2**		**$176**		**0.2**		**$7,700**				
TOTAL	**620,000**	**GSF**	**$0.03**	**$15,840**	**4,000**	**GSF**	**$0.26**	**$1,056**	**231,000**	**GSF**	**$0.20**	**$46,200**				**N/A**

EXISTING BUILDINGS

	Commercial High Rise				Commercial Low Rise				Residential High Rise				Residential Low Rise			
	Quantity	Unit	Unit Cost	Total	Quantity	Unit	Unit Cost	Total	Quantity	Unit	Unit Cost	Total	Quantity	Unit	Unit Cost	Total
24.1 Ensure Toilets & Sinks Work Without Power																
Battery Powered																
Furnish and install 1 Zurn ZTR6200EV battery powered flushometer per unit									175	EA	$1,000.00	$175,000				
Furnish and install 1 Zurn Z6914 battery powered faucet per unit									175	EA	$750.00	$131,300				
Furnish and install 1 Zurn ZTR6200EV battery powered flushometer per gang bathroom	60	EA	$1,000.00	$60,000								N/A				
Furnish and install 1 Zurn ZTR6203 urinal flushometer per men's gang bathroom	30	EA	$1,000.00	$30,000								N/A				
Furnish and install 1 Zurn Z6914 battery powered faucet per gang bathroom	60	EA	$750.00	$45,000								N/A				
Remediation of old electric-only fixtures	150	ALW	$600.00	$90,000					350	ALW	$600.00	$210,000				
Remediation labor	1,200	HRS		Included					2,800	HRS		Included				
SUBTOTAL DIRECT WORK				**$225,000**								**$516,300**				
Contingency		10%		$22,500						10%		$51,630				
SUBTOTAL				**$247,500**								**$567,930**				
GC Mark-ups		20%		$49,500						20%		$113,586				
TOTAL	620,000	GSF	$0.48	$297,000				B	231,000	GSF	$2.95	$681,516				N/A

NEW CONSTRUCTION

	Commercial High Rise				Commercial Low Rise				Residential High Rise				Residential Low Rise			
	Quantity	Unit	Unit Cost	Total	Quantity	Unit	Unit Cost	Total	Quantity	Unit	Unit Cost	Total	Quantity	Unit	Unit Cost	Total
24.2 Ensure Toilets & Sinks Work Without Power																
Electrical With True Mechanical Override																
Premium for 1 battery flushometer with true mechanical override per unit									175	EA	$100.00	$17,500				
Premium for 1 battery powered faucet per unit									175	EA	$200.00	$35,000				
Premium for 5 flush valves with true mechanical override per gang bathroom	60	EA	$100.00	$6,000	4	EA	$100.00	$400								
Premium for 4 urinals with true mechanical override per men's gang bathroom	30	EA	$0.00	$0	2	EA	$0.00	$0								
Premium for 5 battery powered faucets per gang bathroom	60	EA	$200.00	$12,000	4	EA	$200.00	$800								
Remediation of old electric-only fixtures			Not Required				Not Required				Not Required					
SUBTOTAL DIRECT WORK				$18,000				$1,200				$52,500				
Contingency		**10%**		**$1,800**		**10%**		**$120**		**10%**		**$5,250**				
SUBTOTAL				$19,800				$1,320				$57,750				
GC Mark-ups		**0.2**		**$3,960**		**0.2**		**$264**		**0.2**		**$11,550**				
TOTAL	**620,000**	**GSF**	**$0.04**	**$23,760**	**4,000**	**GSF**	**$0.40**	**$1,584**	**231,000**	**GSF**	**$0.30**	**$69,300**				**N/A**

EXISTING BUILDINGS

	Commercial High Rise				Commercial Low Rise				Residential High Rise				Residential Low Rise			
	Quantity	Unit	Unit Cost	Total	Quantity	Unit	Unit Cost	Total	Quantity	Unit	Unit Cost	Total	Quantity	Unit	Unit Cost	Total
24.2 Ensure Toilets & Sinks Work Without Power																
Electrical With True Mechanical Override																
Furnish and install 1 Sloan Royal 113-1-.28 ES-S TMO electrical flushometer with true mechanical override per unit (includes re-wire)									175	EA	$1,100.00	$192,500				
Furnish and install 1 Zurn Z6914 battery powered faucet per unit									175	EA	$750.00	$131,300				
Furnish and install 1 Sloan Royal 113-1-.28 ES-S TMO electrical flushometer with true mechanical override per gang bathroom (includes re-wire)	60	EA	$1,100.00	$66,000								N/A				
Furnish and install 1 Sloan Royal 186-1 ES-S TMO urinal flushometer with true mechanical override per men's gang bathroom	30	EA	$1,100.00	$33,000								N/A				
Furnish and install 1 Zurn Z6914 battery powered faucet per gang bathroom (no faucet with mechanical override available)	60	EA	$750.00	$45,000								N/A				
Remediation of old electric-only fixtures	150	ALW	$600.00	$90,000					350	ALW	$600.00	$210,000				
Remediation labor	1,200	HRS		Included					1,400	HRS		Included				
SUBTOTAL DIRECT WORK				**$234,000**								**$533,800**				
Contingency		10%		$23,400						10%		$53,380				
SUBTOTAL				**$257,400**								**$587,180**				
GC Mark-ups		20%		$51,480						20%		$117,436				
TOTAL	620,000	GSF	$0.50	**$308,880**				-	231,000	GSF	$3.05	**$704,616**				**N/A**