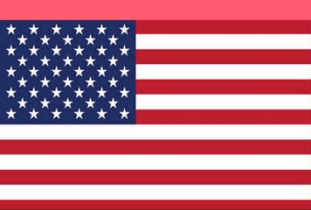




纽约市 交通部

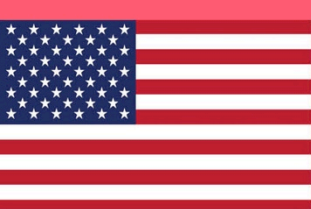
- 任务描述
 - 确保货物和人员在纽约市所有道路和桥梁上安全有效通行。
- 交通局负责维护和维修 5 个区 790 座城市所有车行和人行桥梁。



1865 - 1915

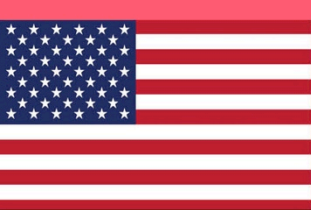


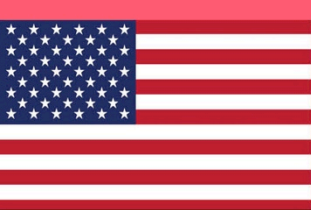
1915 - 1965

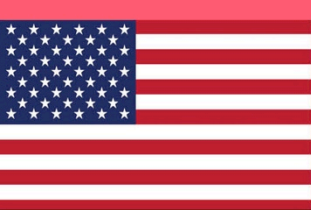


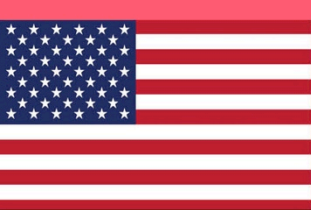
现有桥梁

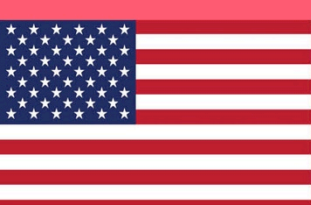
桥梁类型	数量
主干道	208
系统外（当地）	389
人行	107
航道	51
可移动	25
隧道	6
东河	4









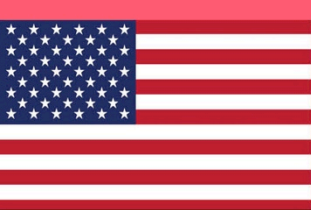




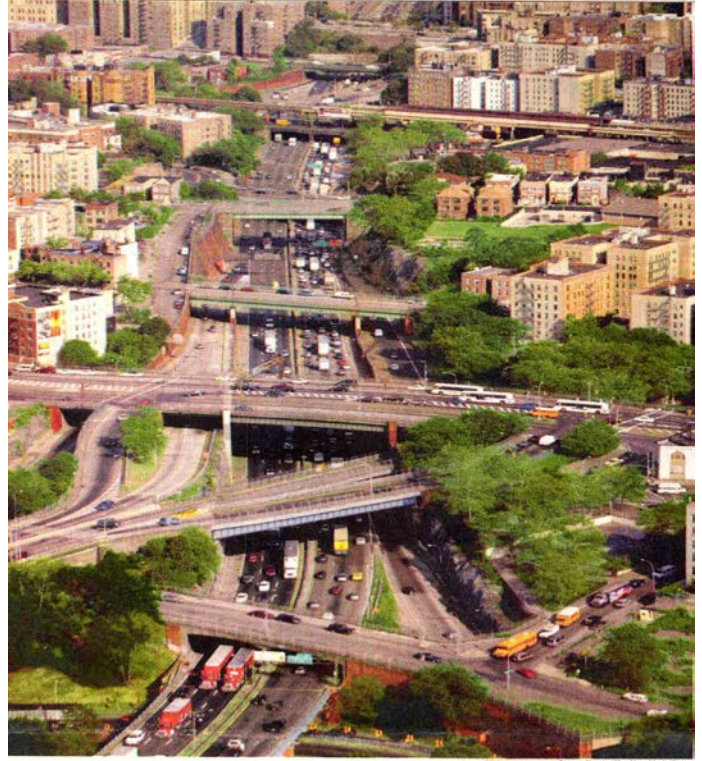
桥梁与隧道操作

各种桥梁类型

- 25 座可移动桥梁
 - 竖直旋转式 (12)、水平旋转式 (7)、垂直升降式 (4)、伸缩式 (2)
 - 6,500 次开启/年
 - 根据需要 24 / 7 全天候开启
 - 移动人员操作
- 电动隧道维护与维修
 - 泵与通风维护

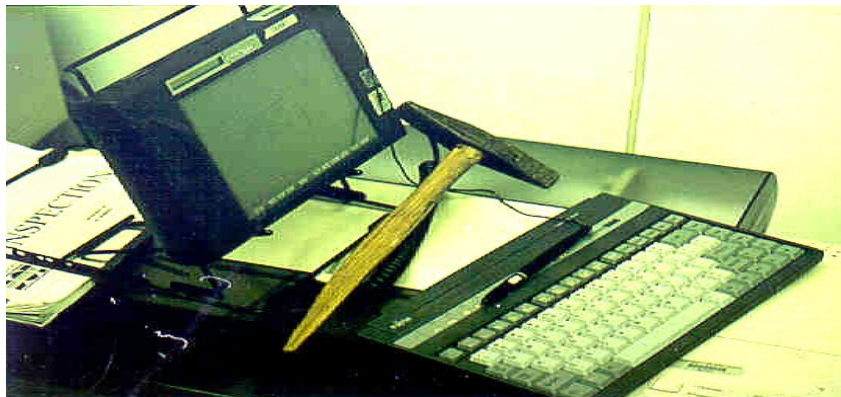
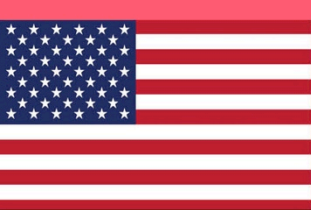


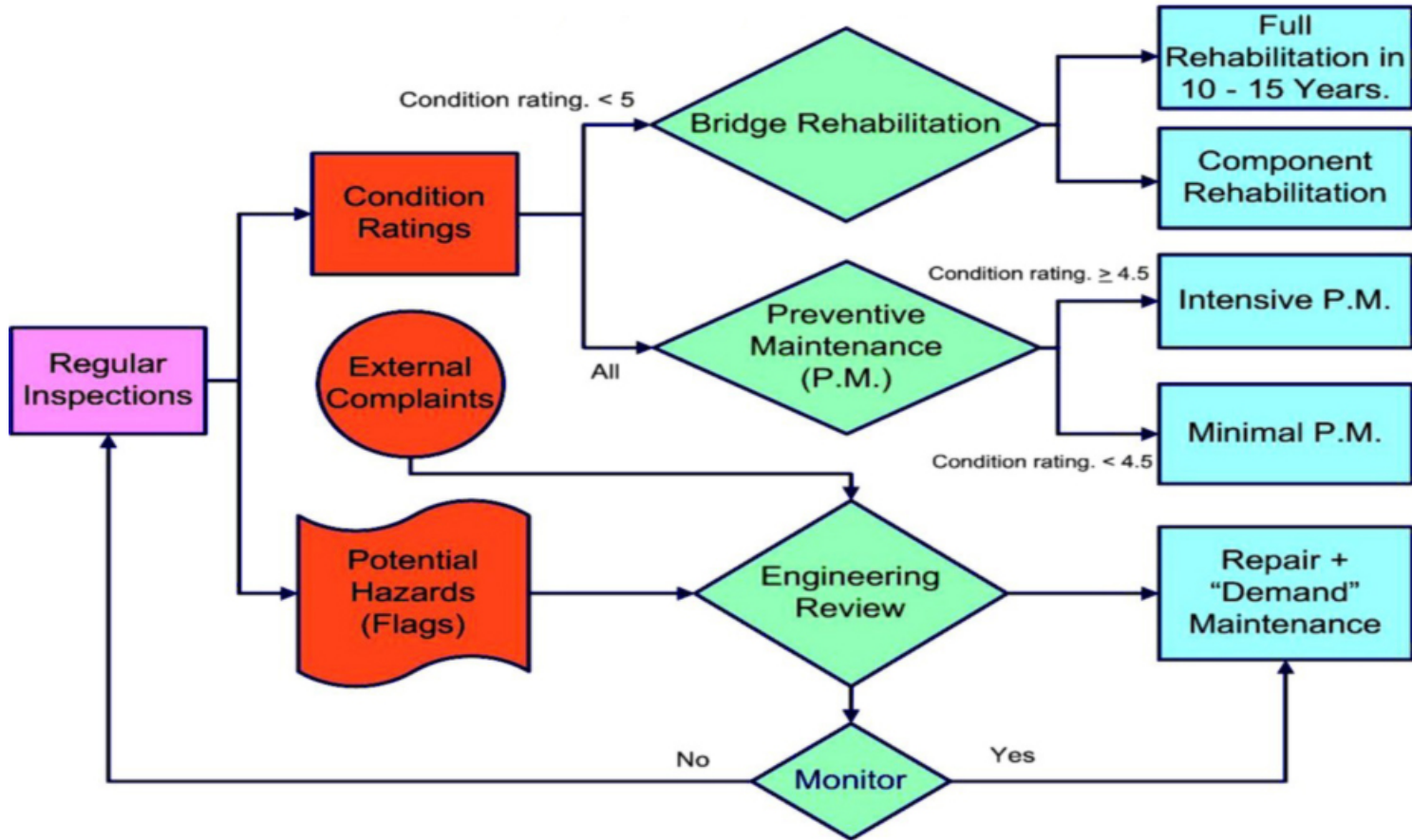
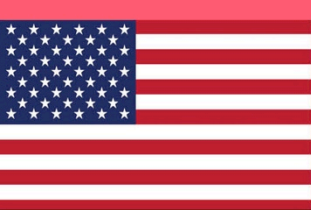
The New York Times

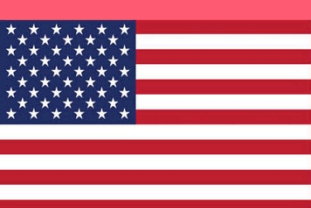


Today, the Cross Bronx Expressway carries nearly 180,000 vehicles and causes roughly that many headaches.

Hell on Wheels. and Nerves



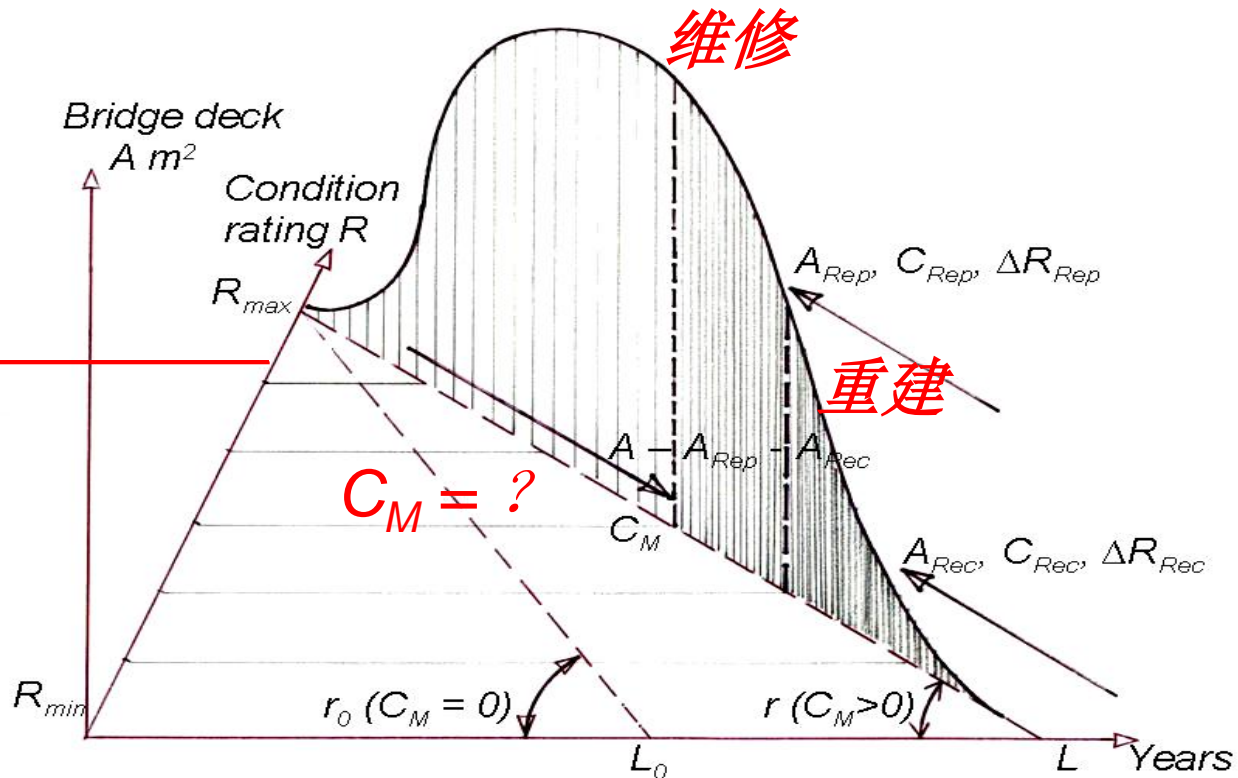




$R_{av} = \text{常量}$

维护成本

变质率



$$5/3(\$450\text{ml.}/450) + 2/1 (\$20\text{ml.}/150) = 15 \text{ ml. ft}^2 \text{ ro}$$

$$\rightarrow \text{ro} = 0.13$$



工作人员

- 操作 – 100（桥梁操作员 + 电气技师）
- 检查 – 29（检查员和员工）
- 标志 – 15（工程师 + 员工）
- 维护：
 - 维修 – 135（工程师 + 熟练工）
 - 预防性维护 – 135（工人 + 操作工程师）
 - 就业再培训局项目经理 – 18（工程师 + 熟练工）
- 员工总人数： **432**
- 桥梁喷漆
 - 内部 – 47（喷漆工 + 员工）
 - 合同工 - 9（工程师 + 员工）



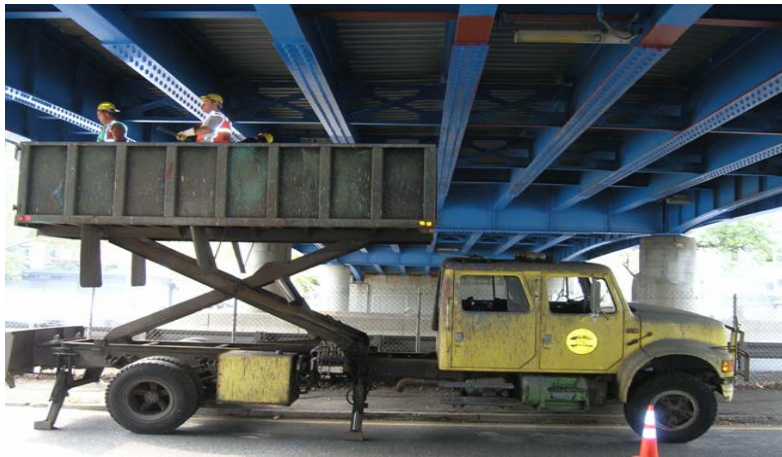
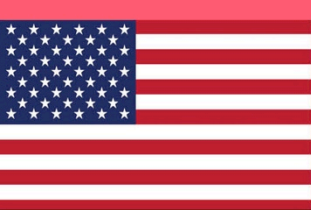
桥梁维护与维修

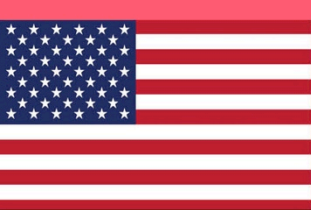
任务	影响*
碎屑清除	6.1%
清扫	5.3%
清洁桥台和支墩	8.1%
清洁开放式格式板	7.0%
清洁膨胀结	9.1%
清洗桥板和浪溅区	5.1%
喷漆	4.2%
点喷漆	3.7%

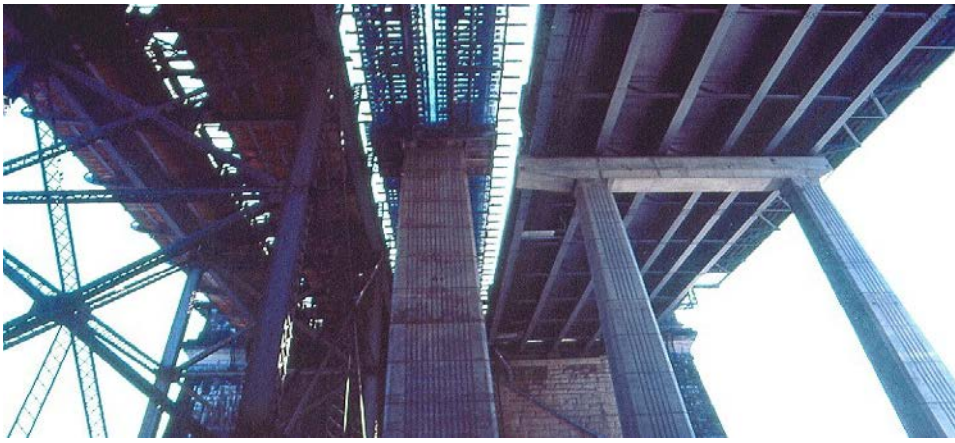
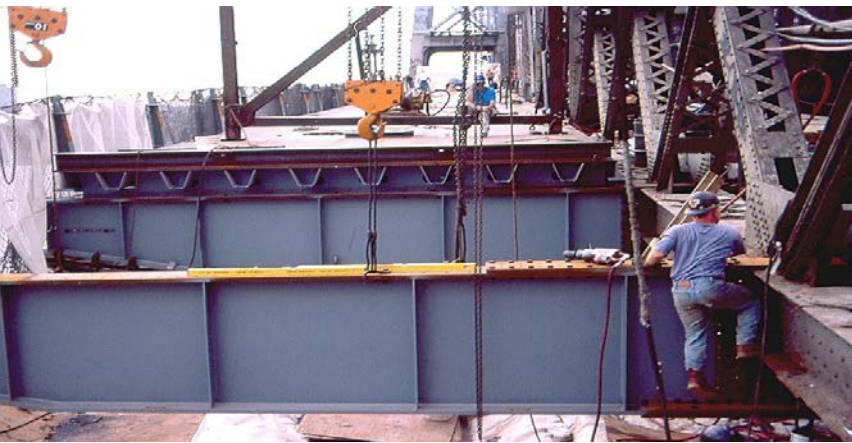
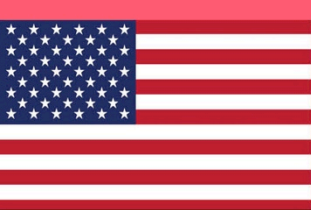
任务	影响*
下水道清洁	10.6%
人行道和路缘石维修	2.5%
人行道和裂缝修补	12.2%
清洗底面	15.9%
机械设备维护	6.7%
更换磨损表面	3.5%

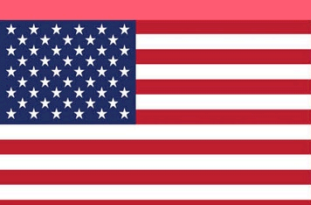
*影响桥梁检定

纽约市桥梁预防性维护管理系统——纽约市高等院校土木工程部联盟（1999年更新）









Brooklyn Bridge Maintenance Plan
List of PM Items

PM Plan				
No.	Description	Frequency	In-House	Contract
1	Debris Removal	Weekly	X	
2	Mechanical Sweeping	Weekly	X	
3	Cleaning of Drainage System	Every 4 months		X
4	Cleaning of Abutment & Pier Tops	Annually		X
5	Cleaning of Modular Expansion Joints	Every 2 weeks		X
6	Cleaning & Washing of Bridge	Annually		X
7	Patching of Sidewalks	Annually	X	
8	Crack Sealing in Pavement & Curblines	Annually	X	
9	Masonry Pointing & Crack Sealing	Annually	X	
10	Repair of Wearing / Microsurfacing Overlays	As needed		X
11	Maintenance of Roadway Bridge Lighting	Every 2 weeks	X	
12	Lubrication of Air & Fire Line Valves	Every 4 months		X
13	Lubrication of Truss Chord Expansion Slides	Monthly		X
14	Cleaning of Wind Tongues	Every 3 months		X
15	Cleaning & Lubrication of eyebars @ Anchorages	Monthly	X	X
16	Painting of Steel (Full Bridge)	Every 12 years		X
17	Spot Painting 1	3 yrs. after 13		X
18	Spot Painting 2 (Painting of Salt Splash Zone)	6 yrs. after 13		X
19	Spot Painting 3	9 yrs. after 13		X
20	Cleaning & Lubrication of Cables @ Anchorages	Annually	X	
21	Lubrication of Solid Rod Suspenders Bearings	Annually	X	
22	Traveler Maintenance	See Maint. Plan	X	
23	Maintenance of Electrical Systems	Monthly	X	
24	Graffiti Protection	Monthly	X	
25	Graffiti Removal	Monthly	X	
26	Winter Plan	As needed	X	



■ 最佳管理实践

- 通知：美国海岸警卫队； 纽约环境保护局； 纽约市警察局

