

Highlights

HIGHLIGHTS

Overview

This report describes work the Fund for the City of New York's Center on Municipal Government Performance has done to develop and produce reliable, unbiased and objective measurements of the smoothness of New York City's streets. We are using two indicators that New York City residents identified as meaningful to them: overall smoothness of the pavement and lack of significant jolts. We are reporting on conditions citywide and in all 59 community districts.

We decided to develop measurements of the smoothness of the city's streets after conducting focus group research which revealed that regardless of income, geography or ethnicity, New Yorkers view the condition of our streets as a critically important government function and a significant measure of city government performance. And city government said new measures could help the city improve its service to the public. Residents said that they felt this service could be improved and that when street conditions are poor, their daily lives are disrupted.

Practically everyone -- pedestrians, residents, visitors, and commercial and private drivers -- experiences the city's streets and observes their condition. Bumpy and uneven streets can precipitate pedestrian and vehicle accidents, increase driver fatigue, and damage and shorten the life of vehicles.

By making these findings widely available we hope that there can then be informed dialogue between government and the public. The hope is also that government will seek to align its resources in a way consistent with the public's concerns, and that the public will be informed about issues confronting government along the way. Ultimately, it is our hope that this study will serve as a tool to make the city even safer, make transportation more efficient and improve the overall quality of life in our city.

This work builds on a prior program of the Fund for the City of New York that introduced novel ways for government managers and the public to assess, monitor, report on and improve core services (Scorecards). The recently formed Center on Municipal Government Performance is adding a new emphasis. We now wish to build the concerns of the people of the city into performance measurement systems, and are producing measures that reflect the way people see, feel and talk about city services.

This survey was conducted with the assistance of a grant from the Alfred P. Sloan Foundation which helped us establish the Center on Municipal Government Performance and has encouraged us to create performance measures that are important to and involve the public.

Findings

- **City drivers evaluate a street in two ways: by its overall sense of smoothness or roughness and by whether or not they encounter conditions that cause severe jolts.** Jolts occur from a variety of road conditions including potholes, surface depressions and elevations, uneven repairs, and misaligned utility covers and other street hardware. People also evaluate government performance by how much inconvenience or damage they experience as a result of inadequate street maintenance.
- **It is possible to measure the smoothness of city streets objectively, through methods we developed and implemented.**
- **Sixty percent^{*} of the city's blocks are acceptably smooth,** that is, they had good or fair smoothness ratings.^{**}
- **A driver can expect to encounter, on average, 9.5 significant jolts in every mile traveled as a car rides through the city.** There are 5,946 linear miles of streets in New York City.
- **People told us that while they do not expect city streets to be perfectly smooth, they think that street conditions that cause severe jolts are unacceptable.** They described vehicle damage they had incurred as a result of unevenness of the streets (lost suspensions, shocks, hubcaps, broken axles).
- **People are dissatisfied with the timeliness of street repairs and are even more distressed about the quality of repairs. They say that the standards for and the supervision of repairs need improvement.** (“Repairs are either concave or convex, never smooth,” “The same pothole gets repaired over and over again;” “Tell me why this pothole hasn’t been fixed -- it’s been there for months.”)

* Numbers in this Highlights section are rounded to the nearest whole number or nearest tenth. Subsequent tables and text may show greater detail.

** For a more detailed breakdown, see pie chart on page 10.

- **All boroughs and all community districts have some smooth streets and some very rough streets**, although some boroughs and community districts have proportionately more smooth streets or fewer jolts than others.
- **As for smoothness**, the borough of Queens has the best rating with 64.5 percent of its blocks rated acceptably smooth, while Manhattan has the lowest percentage of smooth streets: 45 percent. The Community District with the best smoothness rating is Brooklyn 18 with almost 84 percent of its blocks acceptably smooth; Manhattan 1 has the lowest smoothness rating: only 24.2 percent of its blocks are acceptably smooth.
- **Regarding jolts**, the borough of Staten Island has the least number of jolts per mile (7.5); Manhattan has the most (14.2 jolts per mile). Brooklyn’s Community District 11 has the least number of jolts per mile of all the community districts (4 jolts per mile). Manhattan 1 had 32.3 jolts per mile, the largest number, by far, for any community district in the city.*
- **It is possible for boroughs and community districts to have differing rankings for smoothness and jolts.** Some streets were quite smooth overall, but were marred by one or several holes or raised surfaces that produce sudden and severe jolts. Some other streets were quite rough but didn’t have conditions that produced significant jolts.

How the Boroughs Rated**

Borough	Jolts Encountered		% Of Blocks Rated	
	Per Mile	Rank	Acceptably Smooth	Rank
Bronx	8.7	3	58%	3
Brooklyn	8.4	2	63%	2
Manhattan	14.2	5	45%	5
Queens	9.3	4	64%	1
Staten Island	7.5	1	56%	4
Total New York City	9.5		60%	

* Brooklyn 11 includes the neighborhoods of Bensonhurst, Bath Beach and Gravesend. Manhattan 1 includes the Financial District, Tribeca, Battery Park City, Civic Center and South Street Seaport area. Brooklyn 18 includes Canarsie, Flatlands, Mill Basin, Marine Park, Georgetown, Mill Island and Bergen Beach.

** For rankings, 1 is best; 5 is worst.

- **Contrary to some expectations, community districts with the highest household incomes did not have the smoothest streets, nor were the roughest streets in the lowest income districts.** Jolts and smoothness ratings for all community districts appear later in this report.
- **Surprisingly little has been done to develop ways to objectively measure the smoothness of city streets,** although a good deal of research and resources have been allocated over the years to measure highway and airport runway surfaces.
- **Photographs of streets do not necessarily reflect how smooth they are.** While it is valid for trained observers to use photographs to rate some services such as the cleanliness of the city's streets -- an approach we introduced in Project Sanitation Scorecard -- one cannot always see in a photograph the uneven and rolling surfaces that produce rough rides. A different method is needed to measure street smoothness.

Citywide Findings at a Glance

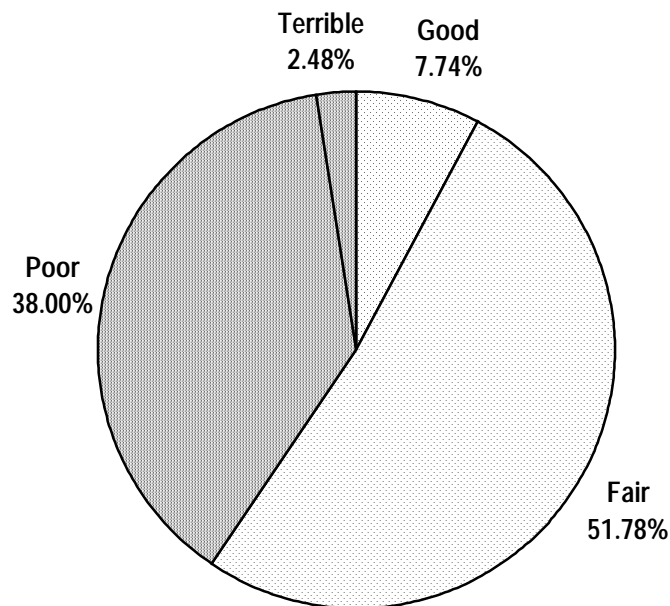
JOLTS ENCOUNTERED

Number of Jolts Encountered Per Mile:
9.49

SMOOTHNESS SCORE

Percent of Blocks Rated Acceptable*:
59.52%

SMOOTHNESS: HOW THE BLOCKS IN NEW YORK CITY RATED



*Blocks rated acceptable include those in the Good and Fair categories.

CITYWIDE INFORMATION

Total Number of Street Miles (linear): 5,946.18 Total Number of Blocks: 75,766

NOTE: In the computation of Smoothness Score, blocks are weighted by length. For description of methodology, rating categories, and weighting procedures, see Technical Appendix.

Our Innovative Approach

Although producing measurements of city streets that are meaningful to people who use the streets sounds like a fairly easy and commonplace thing to do, time and again, we were told that what we were doing had never been done before. Three significant innovations of our work are:

- **It started with the public's perspective of an important city service.** We began our work by asking a broad array of New York City residents how they assess city services and then developed ways to measure the condition of the streets from their point of view. More typically, government performance measures emanate from government managers without prior consultation with the public.
- **We introduced laser scanning profilometry technology in New York City to objectively measure city street smoothness and matched those results with people's ratings.** Currently, inspectors and engineers survey the city's streets by visually inspecting them for certain significant defects and rate them using a series of photographs that represent a range of pavement conditions. Street smoothness, as such, is not measured.
- **This technology has been applied in a novel way, in a city.** While the technology and roughness and bump indices used derive from standards set by an international project sponsored by the World Bank and by research sponsored by the Transportation Research Board, and by the Boeing Company, they have been used primarily on highways and on runways. We fine-tuned them and adapted them for use in a city for the first time, for the purpose of communicating about this government service to the public.

Methodology

Many steps were involved in the process of producing these new measurements. The two guiding principles were:

- (1) we would measure what people in the city considered important, and
- (2) the measures would be objective, valid and replicable.

Some of the key steps we took are outlined below.

- **Conducted focus group research and listened to New Yorkers tell us how they rated government performance, including how government maintains the city's streets.** We heard from 151 people from 29 different community districts: people from various generations, ethnic groups and income categories.* We also asked New York City drivers to rate street conditions as they experience them.
- **Consulted with local government.** City officials confirmed that performance measures reflecting the riding experiences of the public would be valuable and consistent with the administration's emphasis on improving customer service and quality of life.
- **Conducted world-wide searches for appropriate technology and approaches.** Comprehensive literature and Internet searches, plus consultations with government officials, transportation engineers, pavement experts and others in many cities and in other countries, revealed no city that routinely measures and reports to the public on the smoothness and bumpiness of their streets.
- **Considered and tested several measurement methods.**
- **Adapted highway and runway measurements to the city's streets.** The laser-scanning profilometers produced objective, scientific measurements for New York City streets.
- **Matched the profilometer readings with New York City drivers' ratings of the street conditions.** We found a high positive correlation between the profilometer readings and the people's ratings.

* For fuller description of the focus group research, see pages 26-27.

- **Created a City Roughness Index (CRI).** We are reporting street smoothness with a new measure, a City Roughness Index (CRI), adapting standards widely in use for measuring highways and airport runways to city streets.
- **Identified the number of significant jolts encountered per mile,** for all community districts, using a measurement tool called the Boeing Bump Index.
- **Surveyed the city's streets.** To produce the data in this report, we sponsored a survey that measured a random sample of 676 miles of the city's streets, driving a distance equivalent to that between New York City and Ft. Wayne, Indiana. Our aim was to report on what it is like to drive once through all sections of the city, on randomly selected streets and lanes of travel. The survey was conducted in the Fall of 1997.
- **Employed navigational technology to design the routes for the citywide survey.** The survey sample contains 2,360 separate sections of city streets throughout the five boroughs and in all community districts. The Fund created routes with the use of a Geographic Information System (GIS) and state-of-the-art routing software to efficiently survey these streets.

The Route to Creating Street Smoothness Measures

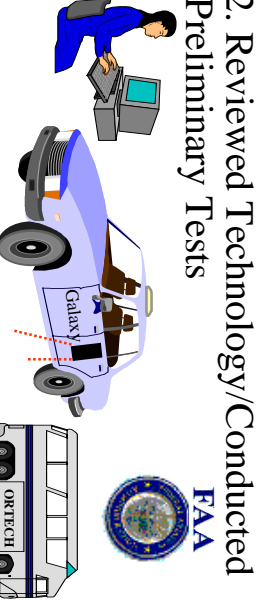
Start Here

Listening and Learning

1. Listened to New Yorkers (DYG Focus Groups)

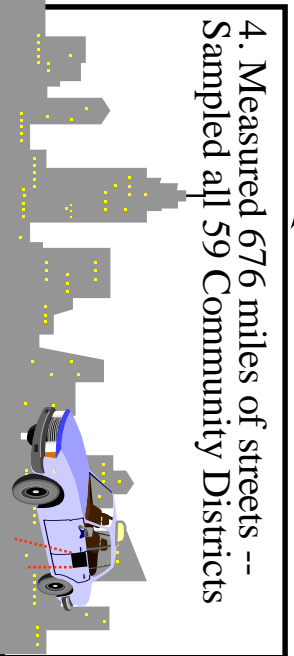


2. Reviewed Technology/Conducted Preliminary Tests



Measuring and Confirming

4. Measured 676 miles of streets -- Sampled all 59 Community Districts



3. Matched Objective Measurement with Citizens' Perceptions

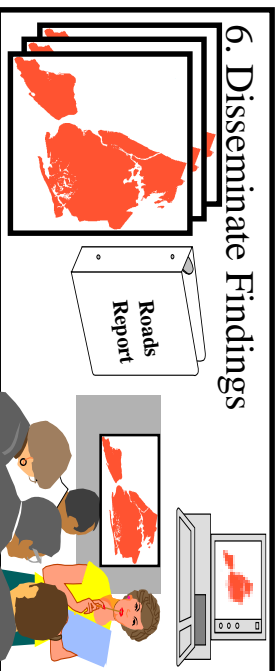


Analyzing and Communicating

5. Briefed NYC Government



6. Disseminate Findings



Ongoing Consultation with New York City Government

DESTINATION: Periodic Retesting. Smoother Streets.