

STATE OF FLORIDA



**2005
HIGHWAY PERFORMANCE
MONITORING SYSTEM
FACTS & FIGURES**

**FL/DOT/SMO/05-485
April 2005**

STATE MATERIALS OFFICE

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What Is HPMS?

The Highway Performance Monitoring System (HPMS) is an inventory system with an integrated database that provides essential information on the extent, condition, performance, use, and operating characteristics of the Nation's Highway System.

What Purpose Does HPMS Serve?

The HPMS was developed in 1978 to address a need for a national highway transportation system database. Since then, several enhancements have sharpened its focus on timely issues and enhanced analytical tools.

Traditionally, HPMS data has been used to support informed highway planning, policy and decision making at the national, state, and local levels. This includes the apportionment and allocation of federal-aid funds as well as the determination of appropriate cost-effective strategies to rehabilitate and preserve existing highway transportation infrastructure.

The HPMS database is unique because it directly ties together the data on the physical, operational, usage (travel), condition, and performance of the roadway that can be analyzed and summarized at sub-state, statewide, and national levels by highway system. A newly added Geographic Information System (GIS) capability will greatly enhance the users' ability to analyze and display HPMS data.

How Does Florida Collect HPMS Data?

The State Materials Office (SMO) of the Florida Department of Transportation (FDOT) collects the required ride data on selected sections of the State Highway System on an annual basis. The SMO began collecting ride data for the HPMS in 1991, in conjunction with its Pavement Condition Survey (PCS) program. Prior to the 1994/1995 Survey, Florida reported the data collected on sample sections only. Thereafter, the Department was required to report the ride values in one direction for both flexible and rigid roadways from the Pavement Management System (PMS) database, in addition to the HPMS sample sections. For PMS purposes, the SMO collects ride values in both directions for divided roadways and in one direction for composite roadways on the entire State Highway System.

Currently, FHWA requires collecting HPMS ride data, in one direction only, on the entire State Highway System. These sections, referred to as "*Designated Sections*," follow the same section lengths and limits as the PCS sections. At times, a *Designated Section* may not be rated for a number of reasons (e.g. section is under reconstruction, part of on-going construction projects, or other reasons). Such sections are referred to as "*Rated Sections*." FHWA further requires the collection of ride data on specific locations (that could be in either direction) which, in most cases, do not coincide with any PCS section. These sections are known as "*Sample Sections*" and are identified by an HPMS ID number, county section number, beginning and ending mileposts.

Prior to the 1998/99 survey, the data was collected using ultrasonic sensors and the ride values were reported in terms of International Roughness Index (IRI) in inches/mile, without any filtering. Thereafter, the Department implemented the use of laser sensors for ride data collection. The ride values are still reported as IRI but filtered to a 300-foot wavelength (IRI_{F300}). IRI is rigorously defined as a specific mathematical transform, or property, of a true profile. The calculation of IRI takes into consideration wavelengths between 4 and 100 feet. It is believed that wavelengths outside this band do not contribute to the roughness felt in vehicles at speeds near 50 mph. IRI values are reported in compliance with the FHWA Appendix E of the *Highway Performance Monitoring System Field Manual*, dated May 2003.

In January of 2000, the SMO started collecting HPMS off system sections ride data, in terms of IRI. The data collection process in this case is similar to that of HPMS sections and is conducted between annual surveys.

The data collected between 1991 and 1996, in compliance with previous FHWA requirements, included bridges, railroad crossings, etc. But these structures are omitted from the database in accordance with Appendix E of the May 2003 HPMS Field Manual.

The five (5) High Speed Profilers used by the FDOT are calibrated in accordance with the manufacturer's recommendations. These profilers are also calibrated every 30 days on field sections exhibiting a range of roughness established with a dipstick annually.

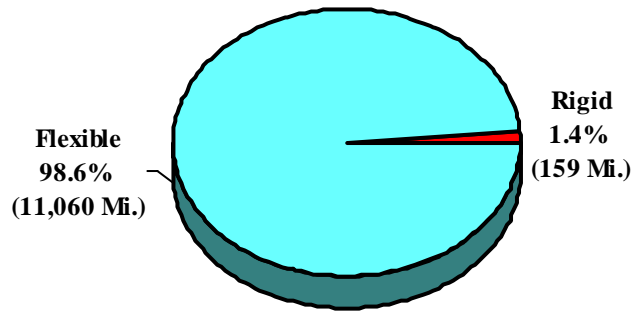
How Does Data Collection Procedures Affect HPMS Data?

Although standards specifying the HPMS data collection and reporting process do exist (Appendix E), their interpretation/implementation may not always be the same among the state highway agencies. For instance, in order to determine IRI values, the profile data may be averaged differently (moving average, straight average, etc.). The profile data may also be filtered differently (no filtering, 300-foot wavelength, etc.). In addition, the profile data may be collected using various sensor types (ultrasonic, laser, optical, or infrared sensors) and different sensor spacing (63 to 71 inches) (transverse locations). Moreover, some states report HPMS data from that collected as part of their PMS, rather than the specific HPMS sample sections. Consequently, it may not be realistic or appropriate to compare data between states.

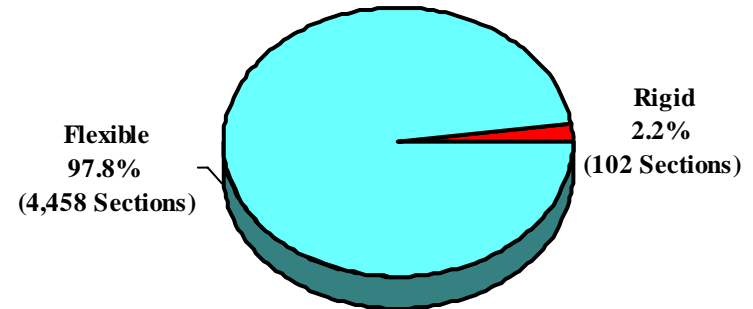
The present report provides essential information on the current ride quality of the Florida roadway system. It also includes a summary of the historical ride data.

2005 Statewide HPMS Sections

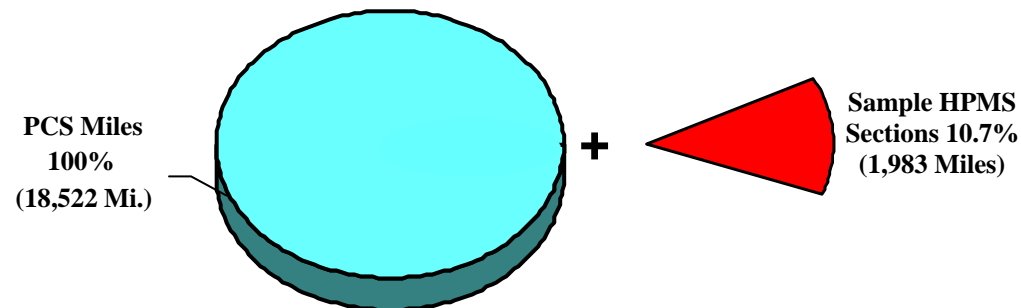
HPMS Rated Miles: 11,219 Mi.
(One Direction from PCS)



HPMS Rated Sections: 4,560
(One Direction from PCS)

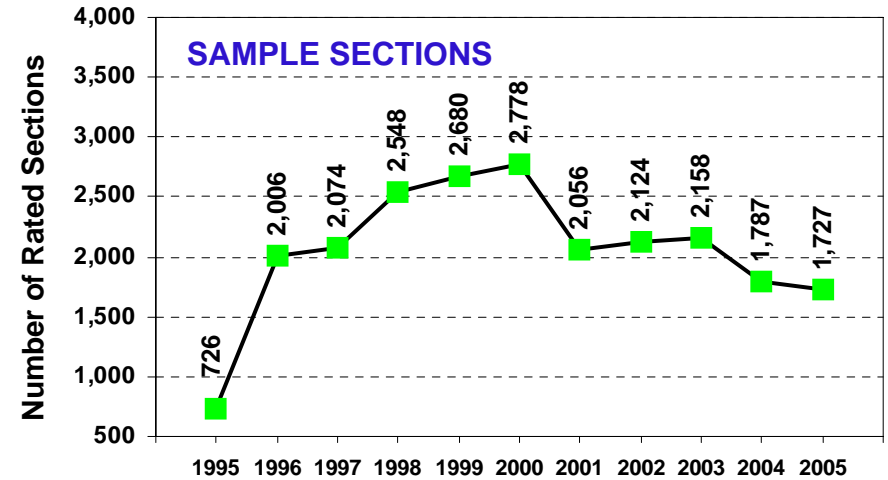
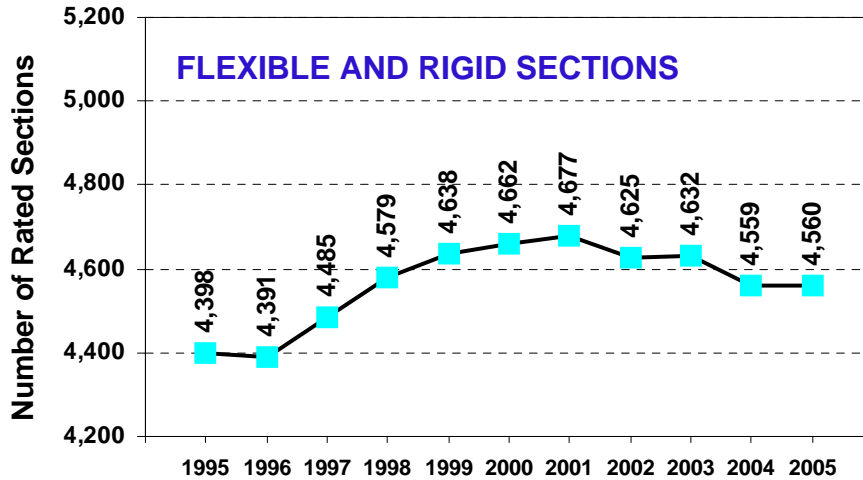
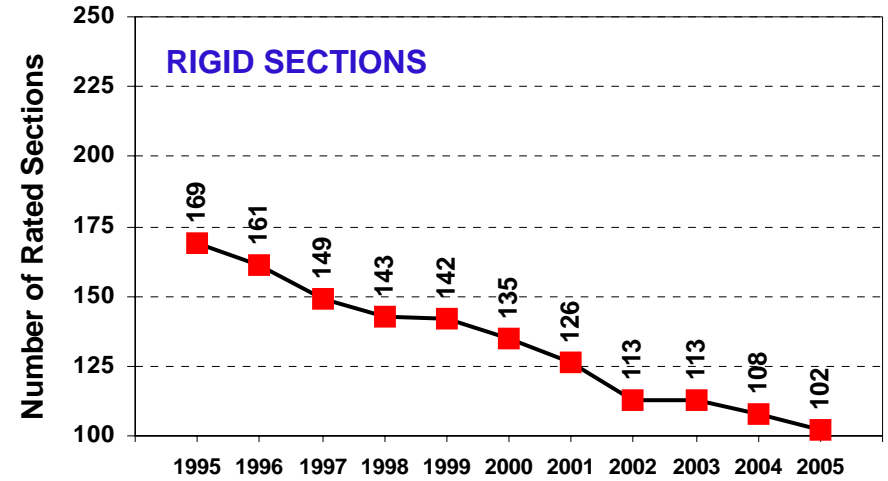
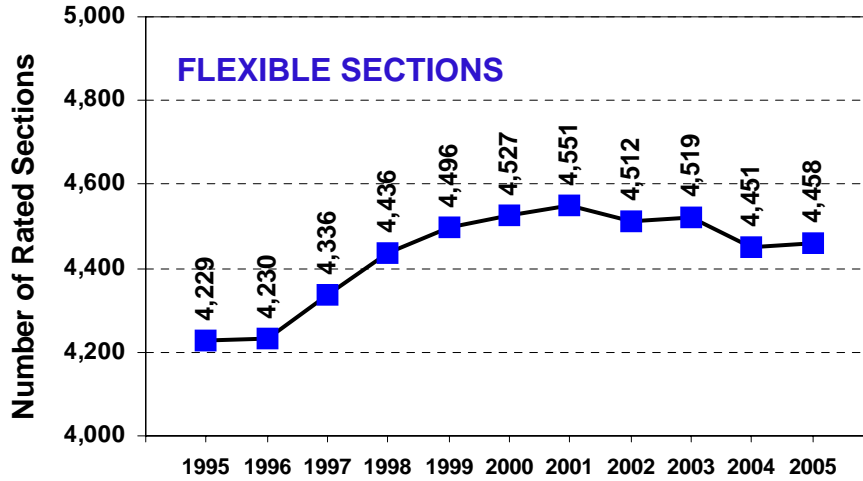


Total PCS Rated Miles 18,522
(Both Directions)

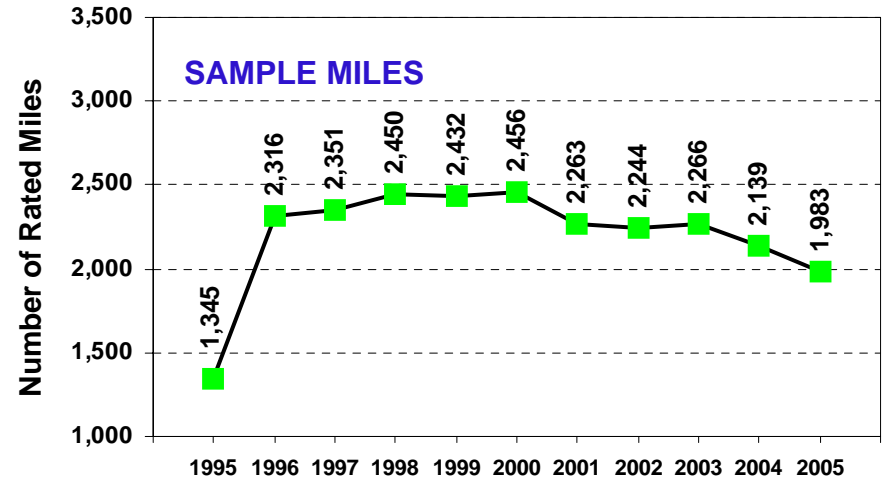
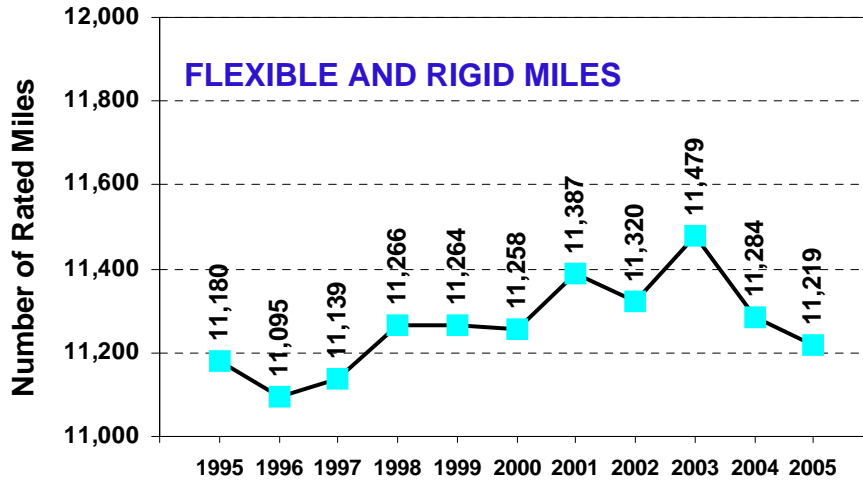
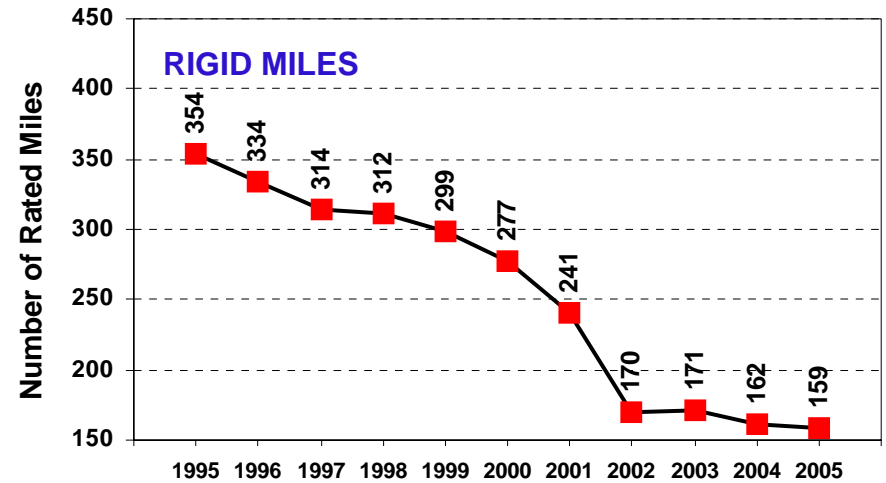
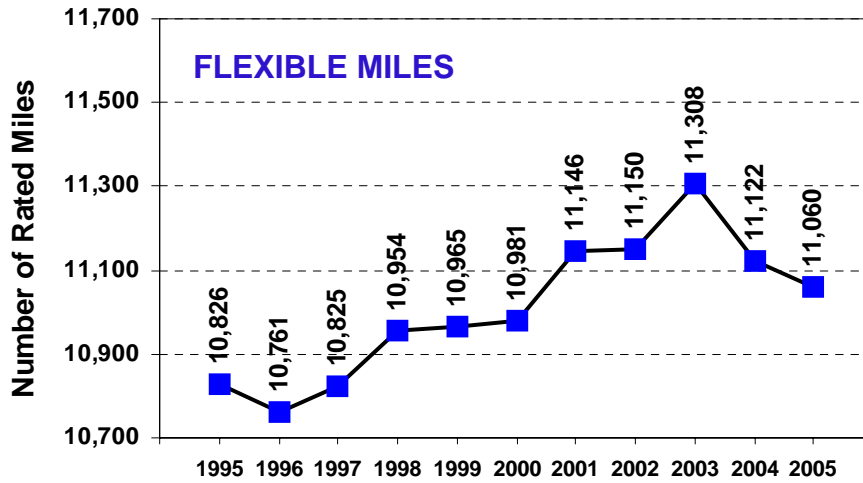


Sample HPMS Sections are extracted from PCS data and reported to FHWA

Historical HPMS Rated Sections

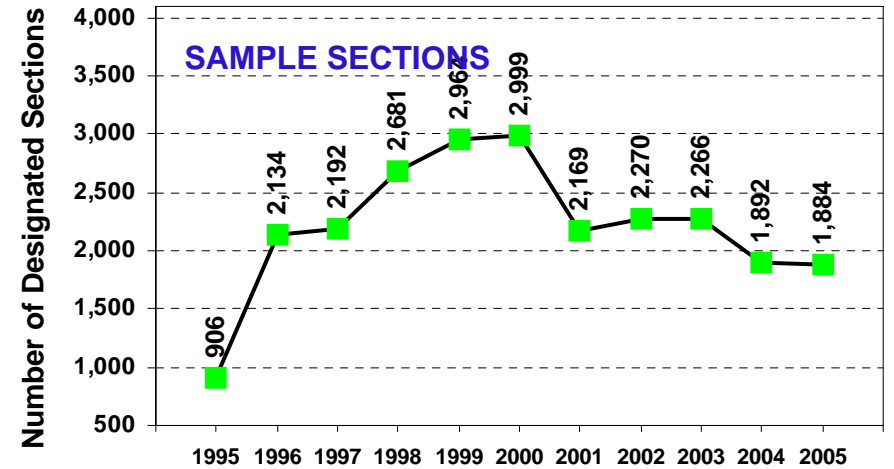
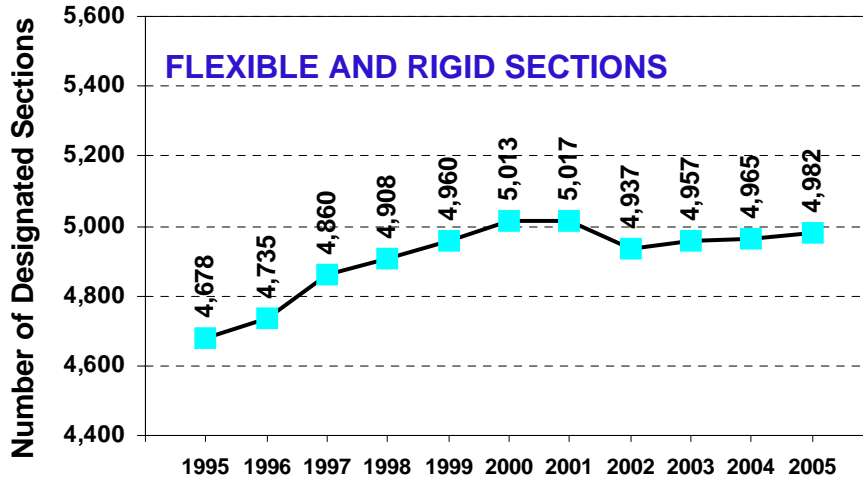
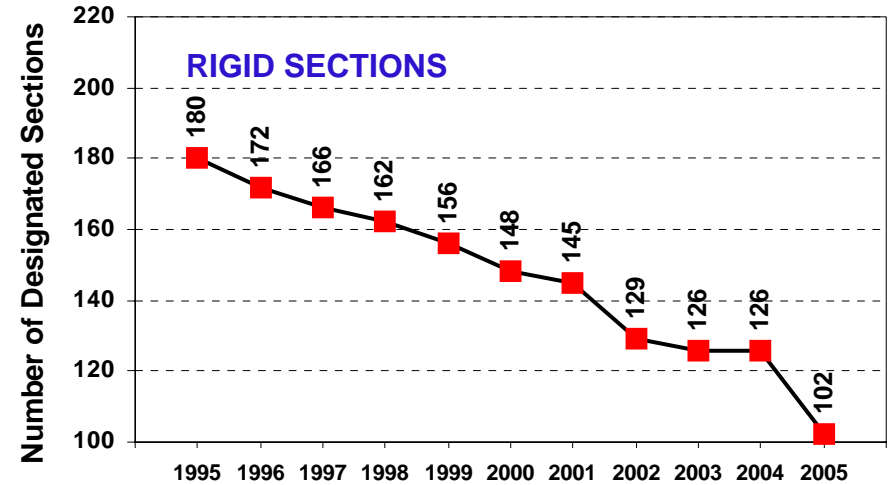
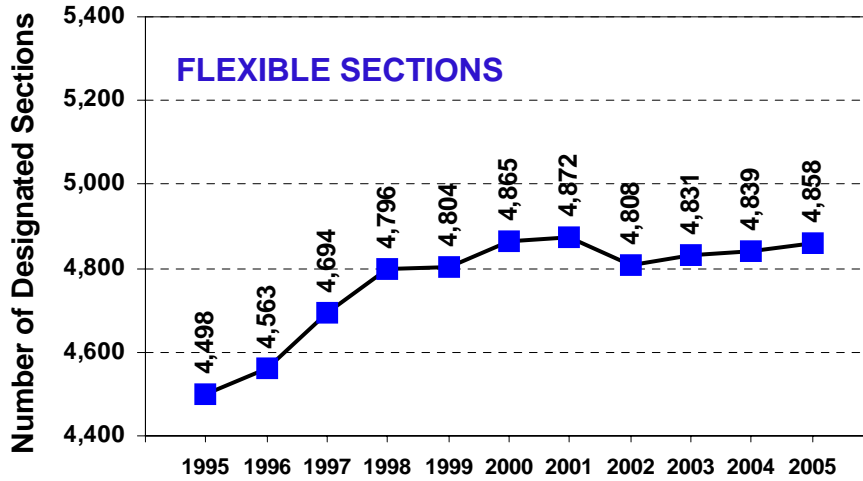


Historical HPMS Rated Miles



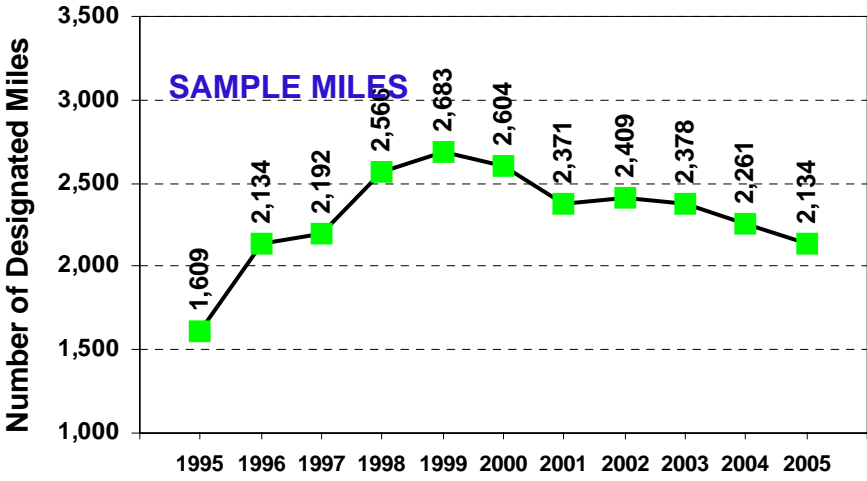
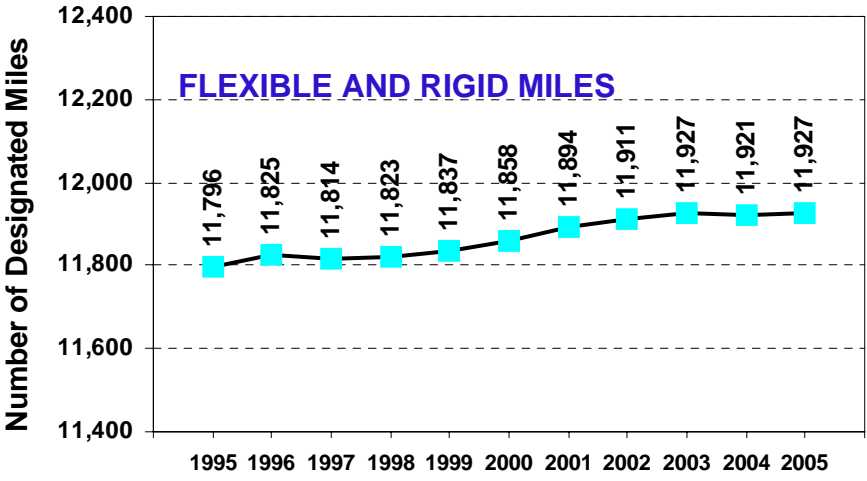
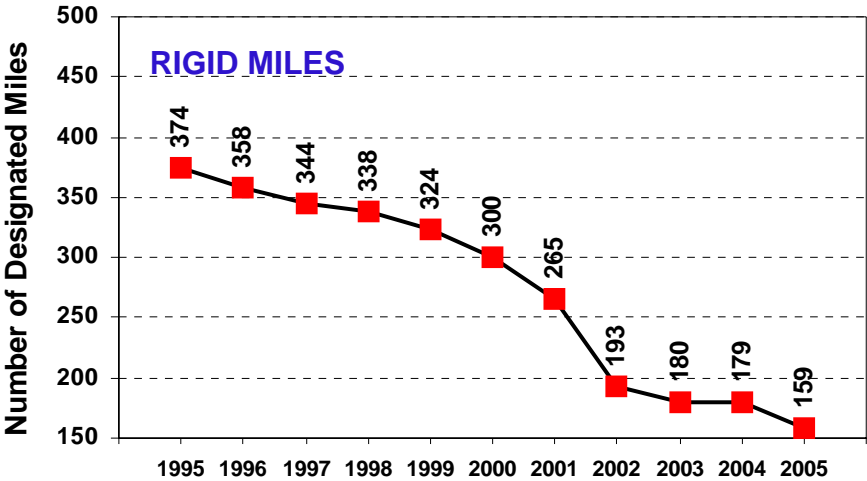
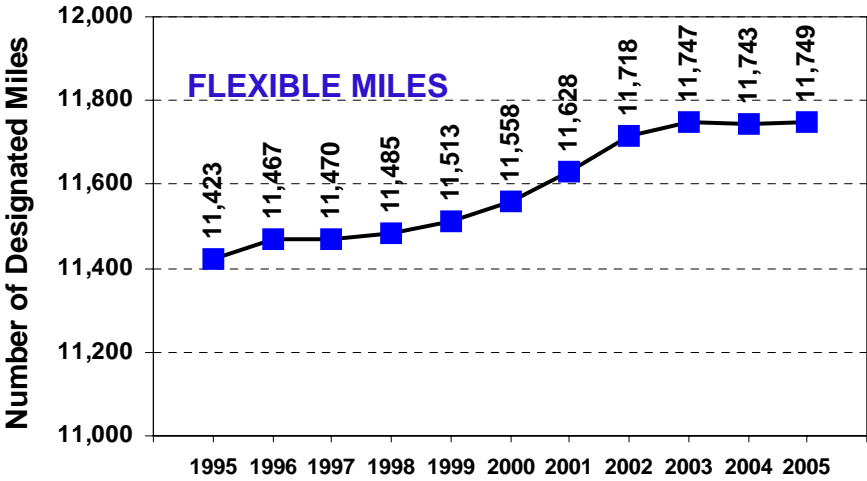
Historical HPMS Designated Sections

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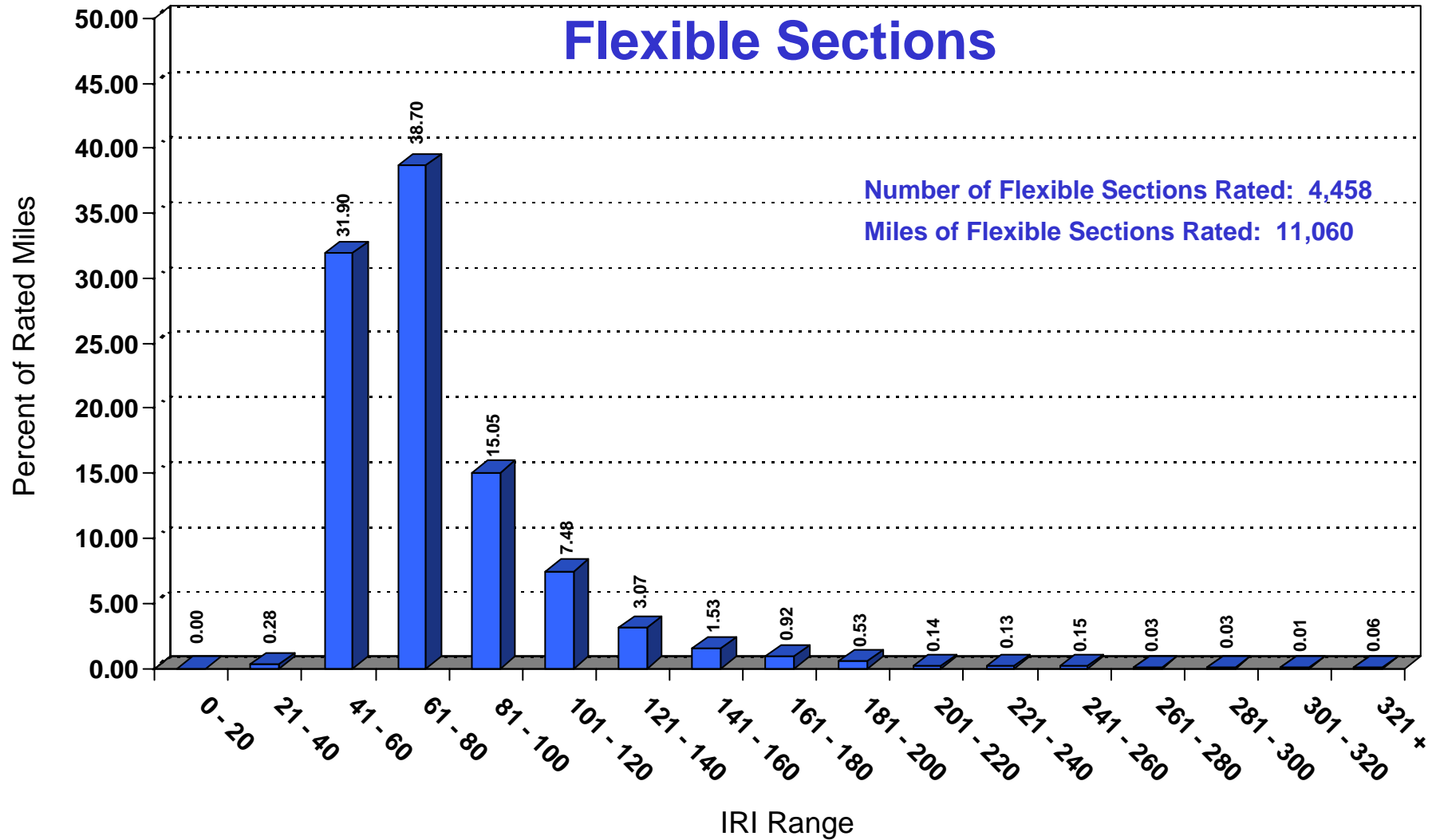


Historical HPMS Designated Miles

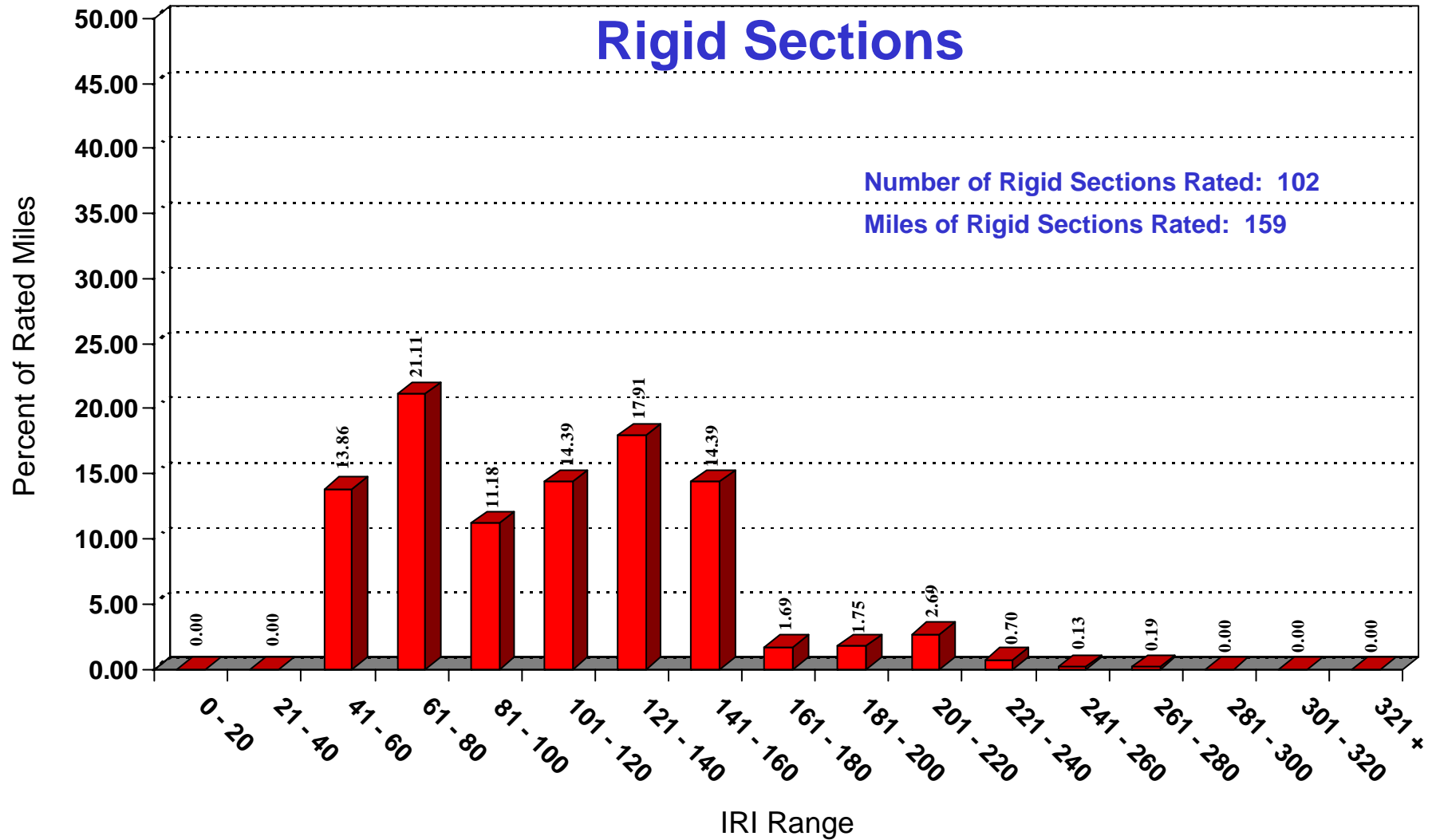
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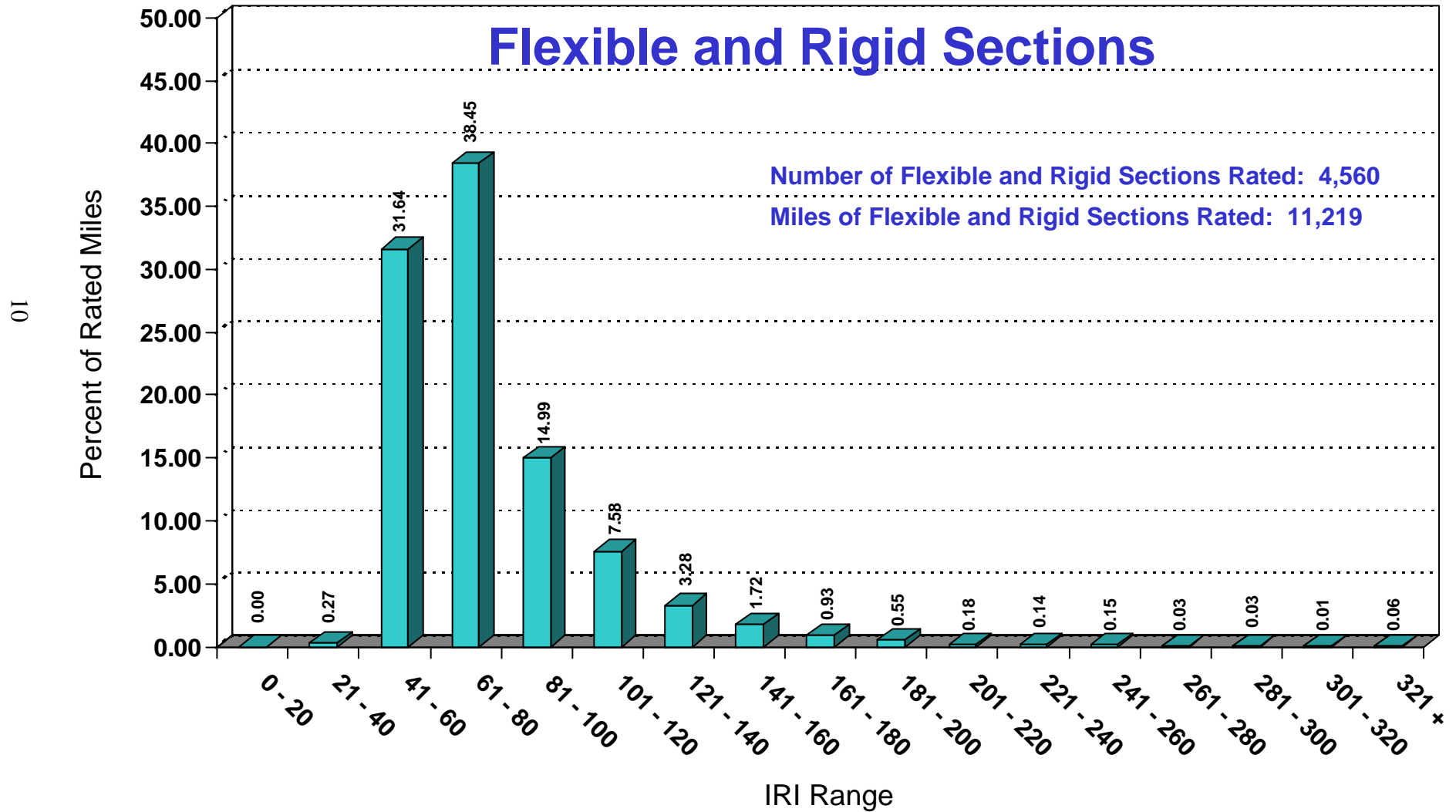
2005 IRI Frequency Distribution



2005 IRI Frequency Distribution

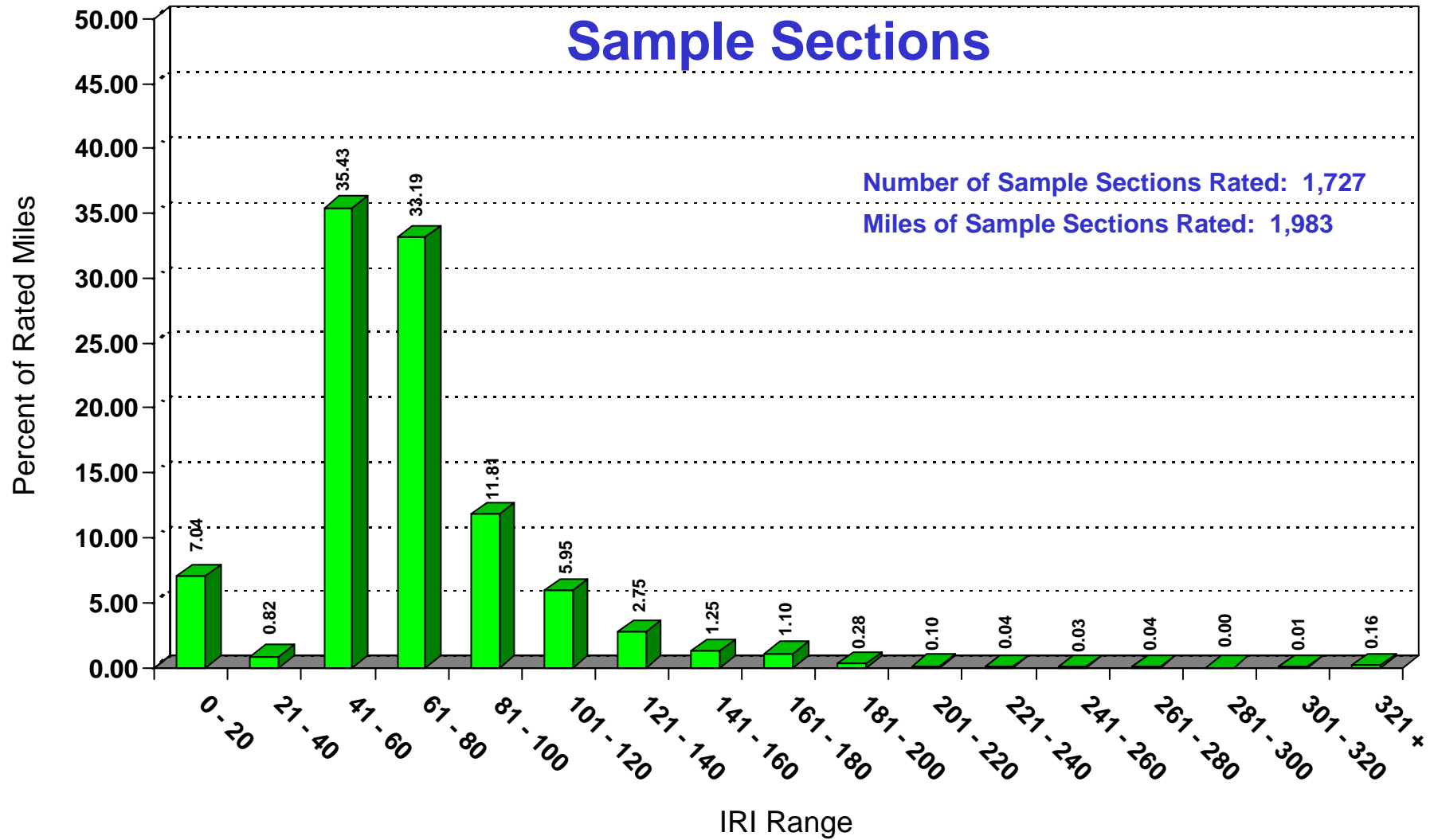


2005 IRI Frequency Distribution

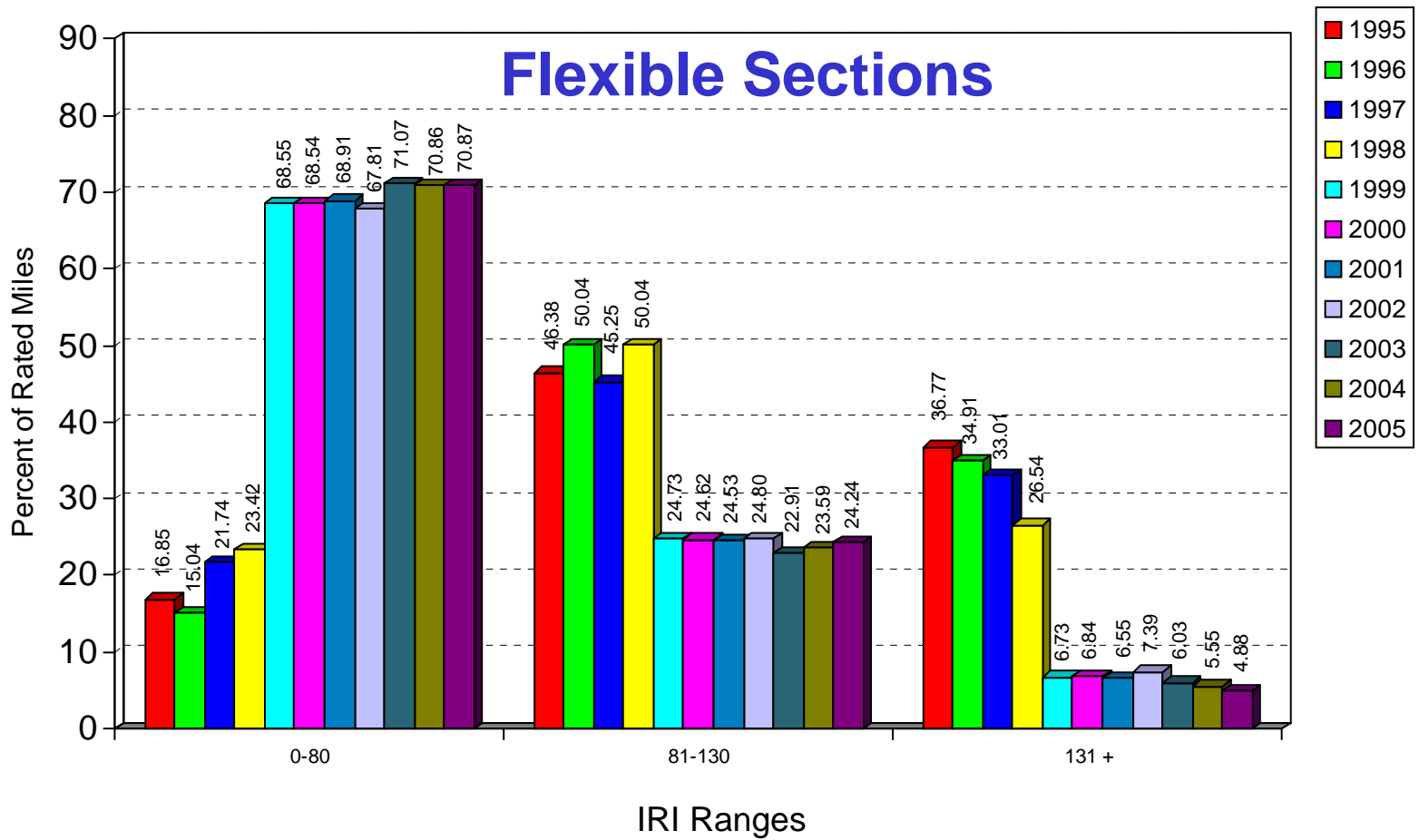


2005 IRI Frequency Distribution

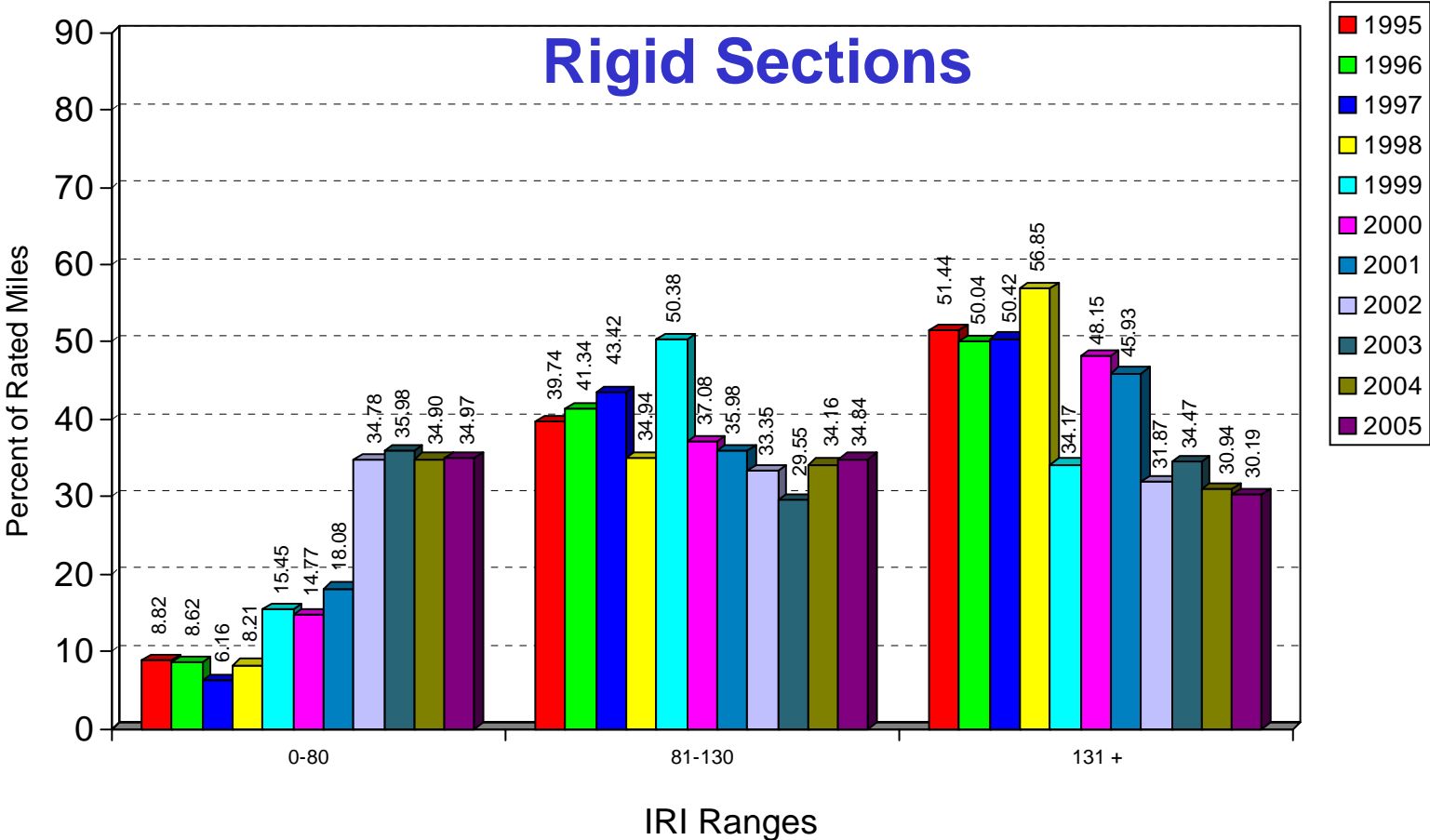
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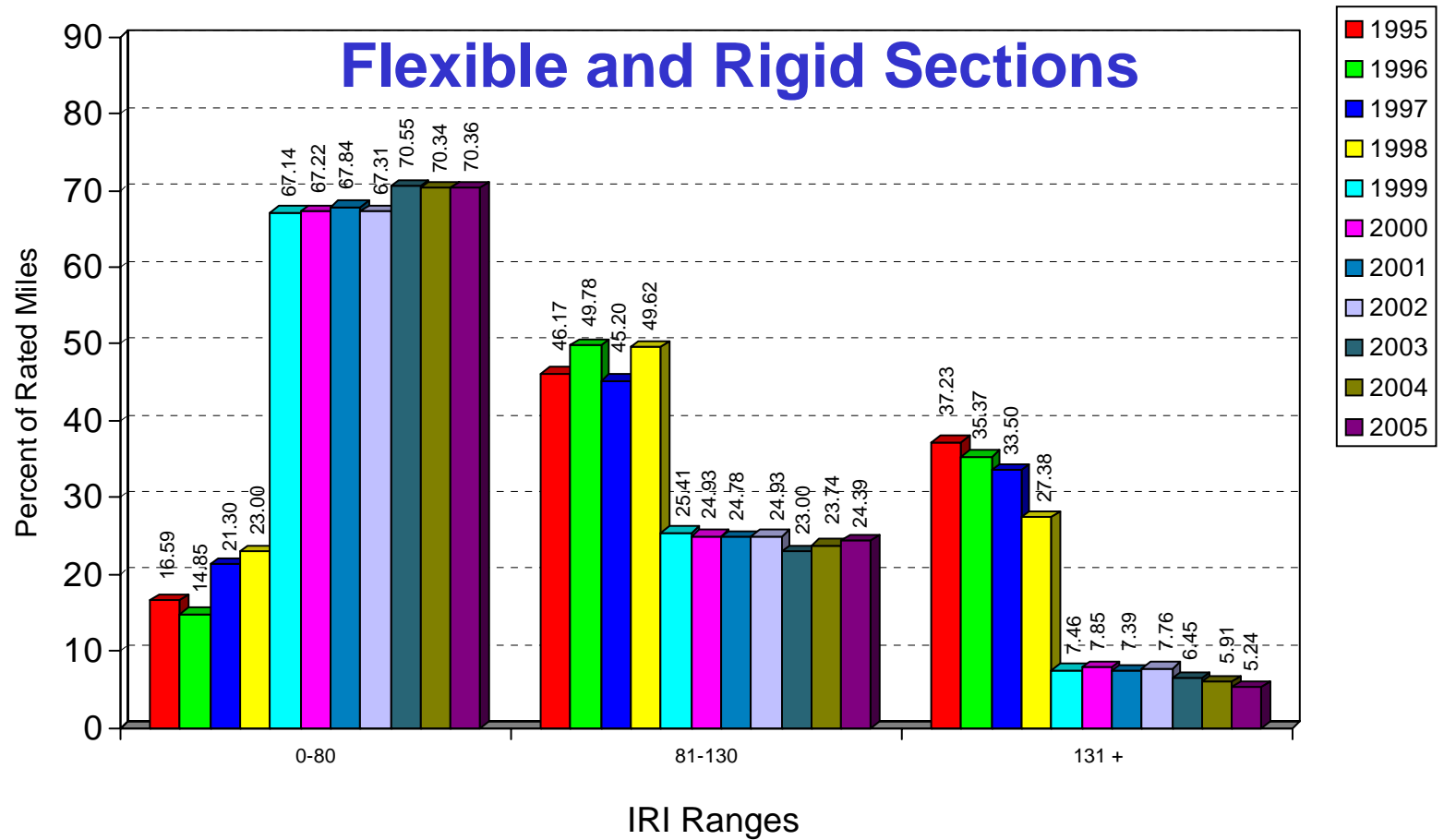
Percent HPMS Rated Miles vs. IRI Range (1995 – 2005)



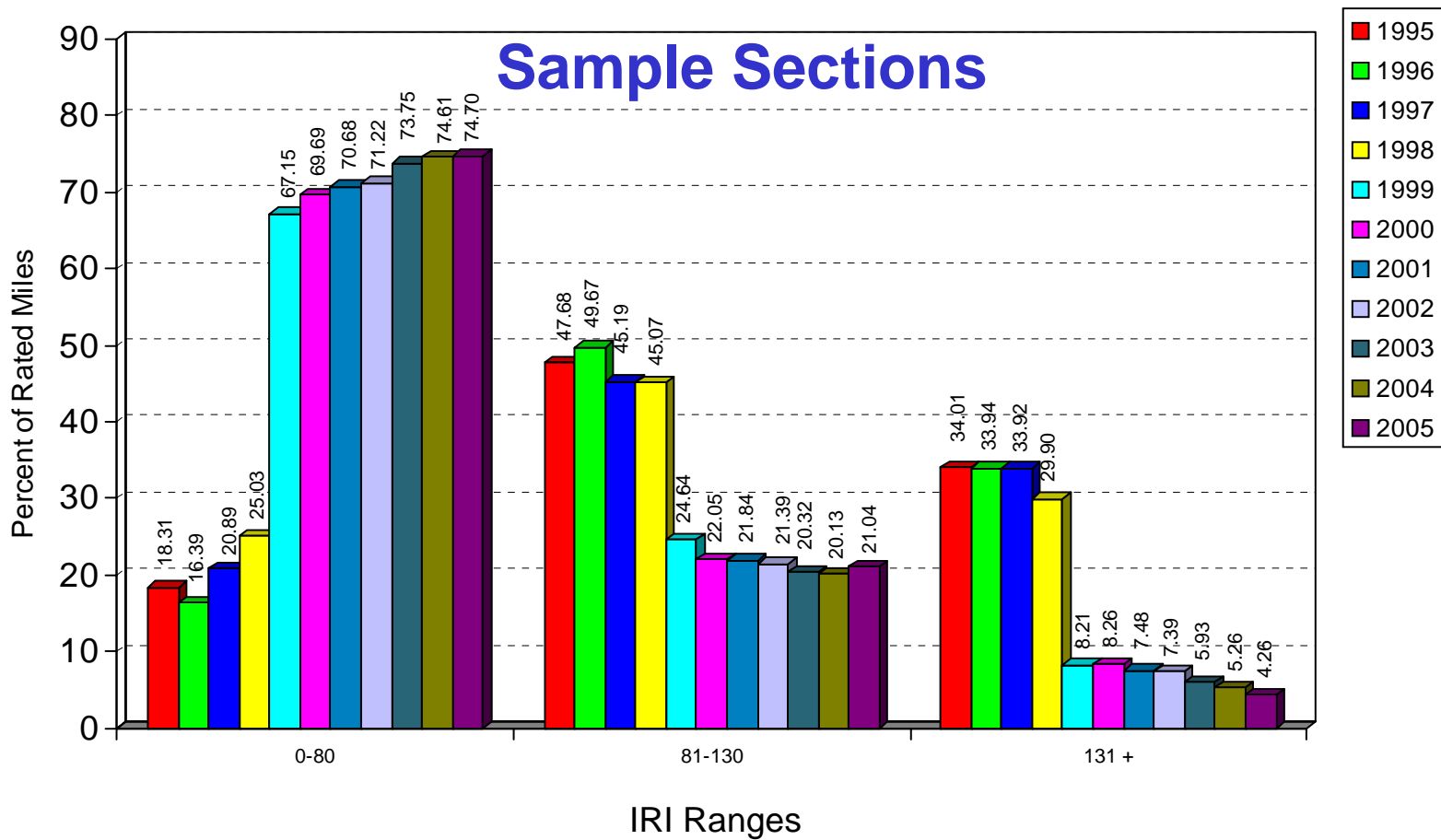
Percent HPMS Rated Miles vs. IRI Range (1995 – 2005)



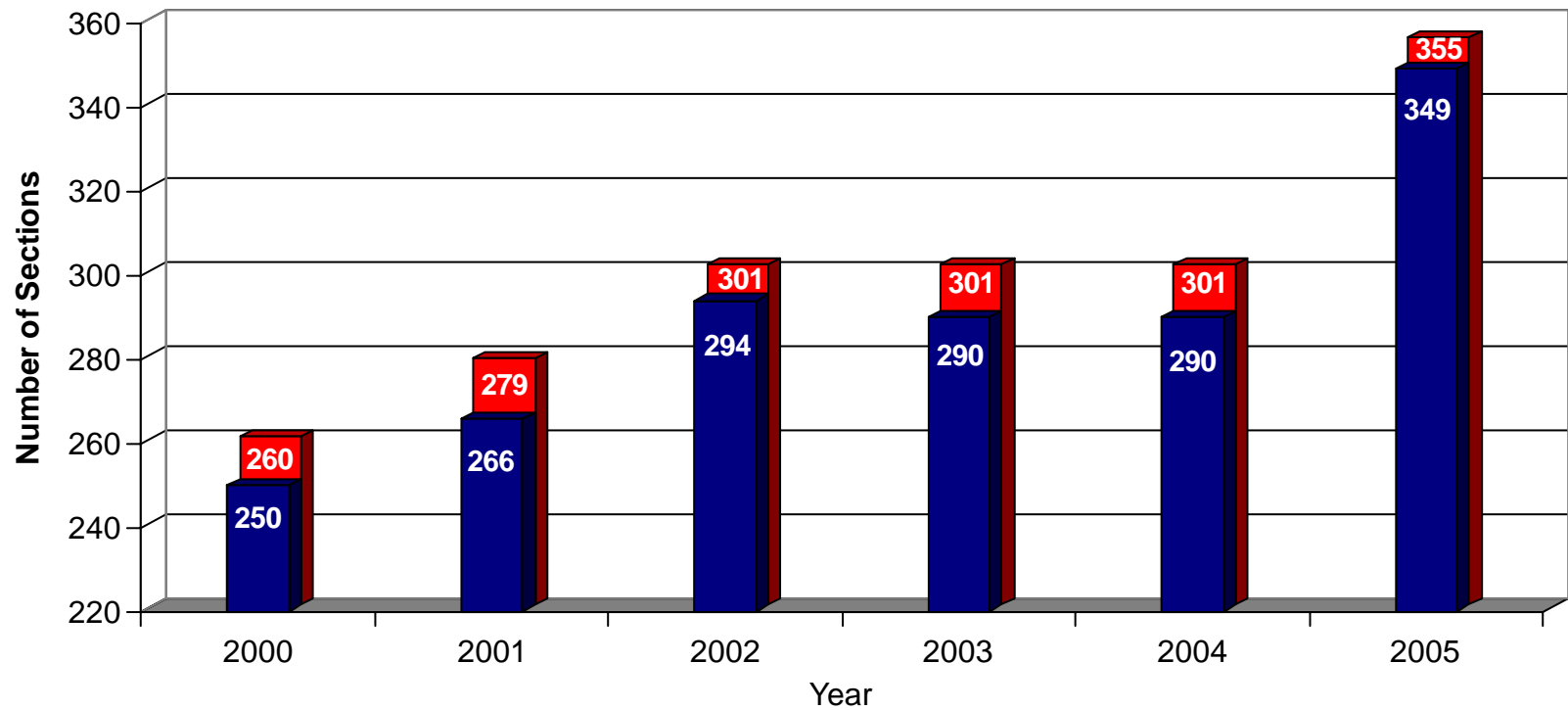
Percent HPMS Rated Miles vs. IRI Range (1995 – 2005)



Percent HPMS Rated Miles vs. IRI Range (1995 – 2005)

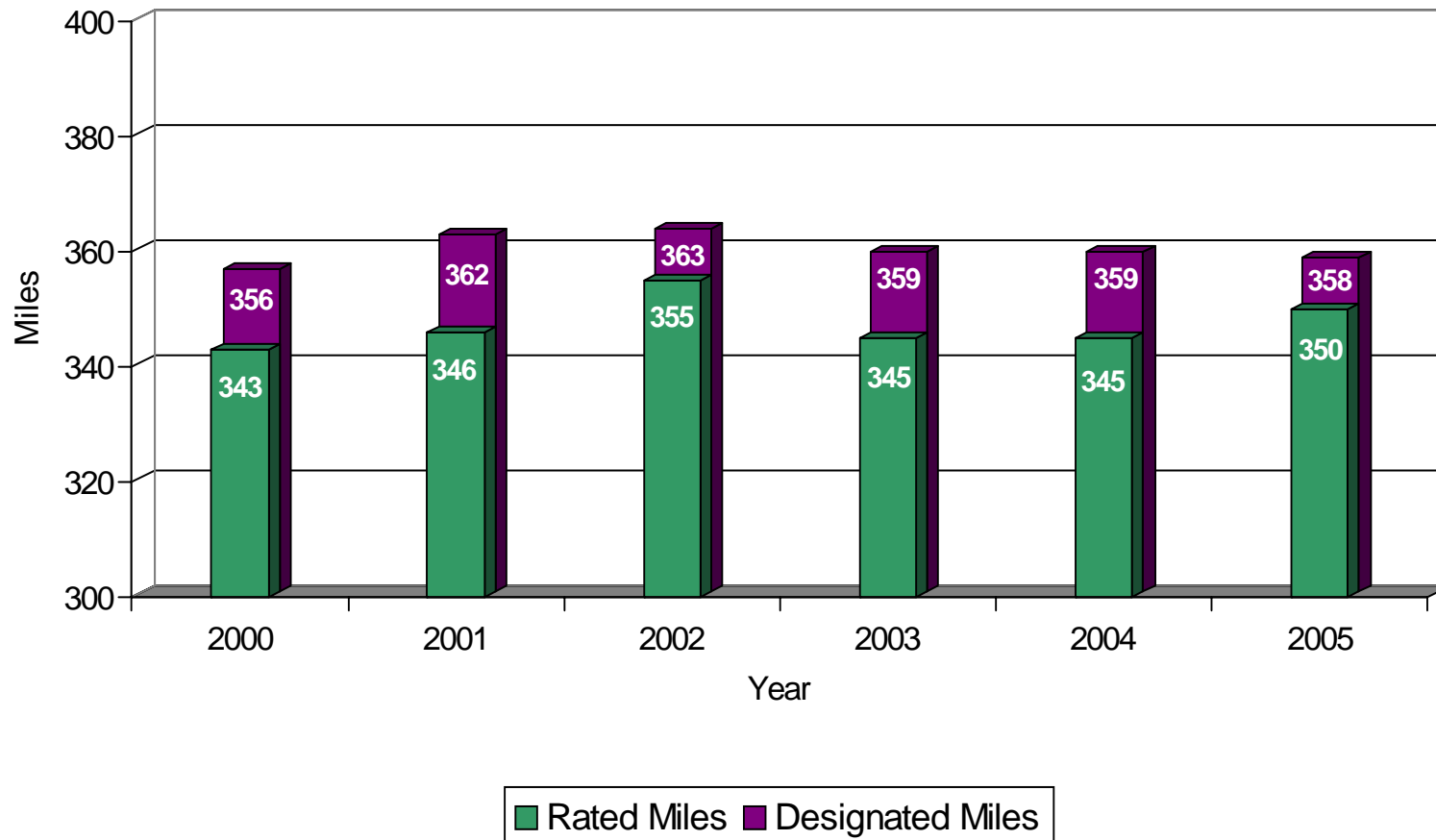


HPMS Off-System Production History: Rated & Designated Sections



■ Rated Sections ■ Designated Sections

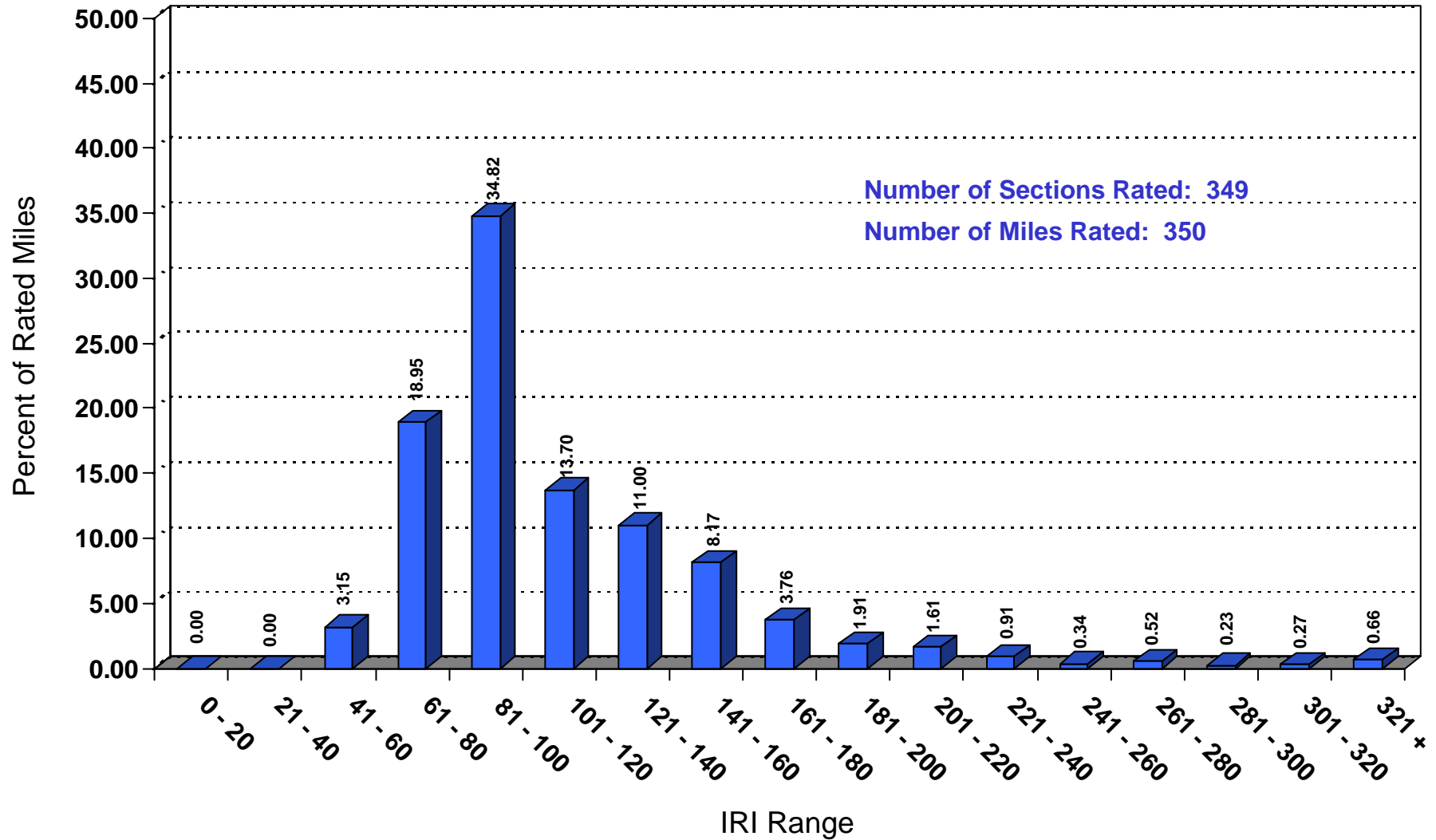
HPMS Off-System Production History: Rated & Designated Miles



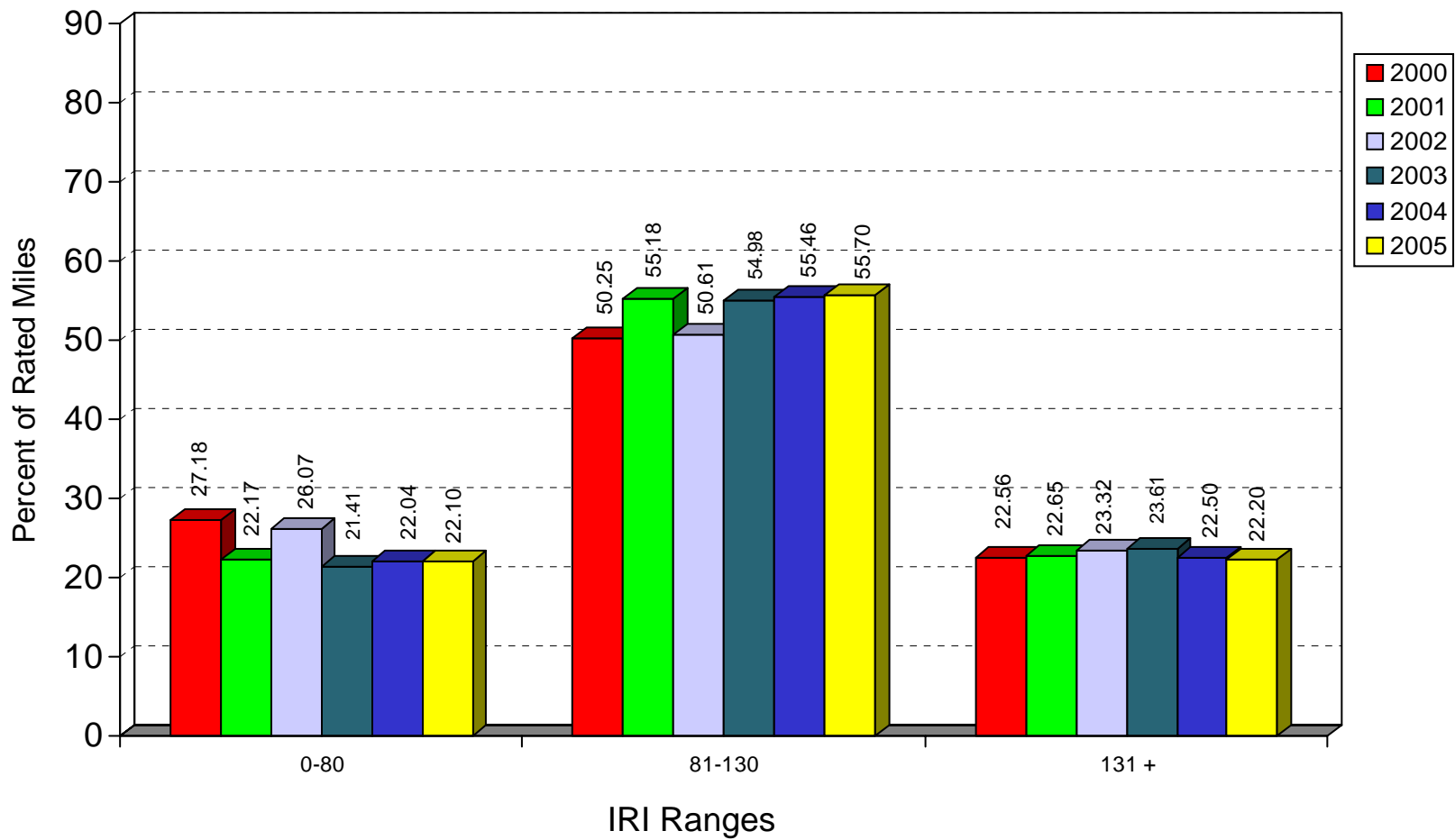
2005 IRI Frequency Distribution

Off-System HPMS

81



Percent of Rated Miles vs. IRI Range (2000 – 2005) Off-System HPMS



2005 Highway Performance Monitoring System

Facts and Figures

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Clarity of Graphical Illustrations	1	2	3	4	5
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Format of Tables	1	2	3	4	5
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