STUDENT TRANSPORTATION BENCHMARKING SURVEY

Michigan School Business Officials

in conjunction with

Management Partnership Services, Inc.

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Executive Summary

The 2013 Student Transportation Benchmarking Survey represents the fourth iteration of the Michigan School Business Officials (MSBO) ongoing efforts to support the efforts of its membership to assess the costs and operational practices of transportation operations across the State. A total of 82 school districts and intermediate school districts from across all areas of the State responded to the survey. The responding entities represented 23 percent of all transportation costs, 25 percent of all buses driven across the state; and 26 percent of total students transported. While this number of districts submitting is substantially lower than previous survey, respondents continued to represent districts from across both the State and various district sizes.

The 2011 Benchmarking Report noted the significant changes in the State's student transportation landscape. Analysis of the survey responses and statewide data available continue to indicate declines in both expenditures and ridership across the State. The 2011 SE-4094 indicated a 5 percent reduction in expenditures and a 7 percent reduction in ridership when compared to 2009 values. All categories of students experienced ridership declines. Regular education and Section 52 students experienced expenditure reductions while there was a 27 percent increase in Section 53 student transportation costs.

The most recent statewide data continued to indicate an increase in the volume of contracted transportation services throughout the state. There was a 49 percent increase in the count of contracted buses between 2009 and 2011. However, the data also indicates that this may have been a one-time event as the number of contracted assets remained flat between 2010 and 2011. The data also indicates that the substantial increase in taxi expenditures identified during the 2009 analysis has been reduced by almost two-thirds of the total. More detailed analysis indicates that nearly 60 percent of all taxi related costs are from one school district and one intermediate school district.

The respondents had an overall average cost per rider of $877, which represented a 6 percent decrease over the 2009 value. The continued disparity between special needs and regular education rider costs is a challenge that will require on-going management attention. Cost data indicates that special needs student transportation costs continue to remain 8 times greater on a per student basis than regular education costs. Average per bus cost of $52,829, which represents an increase in average costs per bus since the 2009 survey. This increase is most likely attributable to the change in the mix of districts submitting survey responses.

Issues with fleet replacement and maintenance staffing remain prevalent in this version of the survey. Average fleet age continues to remain at 9 years and average mileage is more than

130,000 for the vehicles across the state. The number of buses assigned to a technician was 26 for the respondents to the survey, which is consistent with 2011 results. The consistency of these results with the 2011 values indicates the ongoing concerns with fleet maintenance staffing remain for districts across the State.

Despite continued reductions in total costs and ridership, the cost per student both statewide and within the survey group remain consistent. While the number of districts submitting data to the survey was down substantially in 2013, the results show that cost pressures related to special needs transportation and fleet management continue to be significant concerns. The contradictory nature of these indicators continues to demonstrate the challenges that school districts face in managing transportation services.

Introduction

The Michigan School Business Officials (MSBO) began surveying transportation operations in 2007 as part of a unique effort to establish a consistent and quantifiable method to assessing student transportation. Throughout the survey process the objectives of this effort have always been to:

1. Define a series of relevant indicators of operational performance.
2. Develop a mechanism whereby districts will be able to compare their performance internally and to comparable districts across the state.
3. Increase the availability of quantitative measures to evaluate operational performance.
4. Identify best management practices through analysis and interpretation of survey results.
5. Establish a mechanism to evaluate the impact of changes in policies or practices on transportation efficiency and cost effectiveness.

Using data reported to the State as part of the SE-4094 and supplemental data captured during the survey process, a collection of input and output measures have provided a statistical profile of student transportation across the State. Inputs such as the cost of services and the number of students transported were used to calculate output indicators such as the cost per student transported and cost per bus used.

The continued goal of this report is to offer insight and information to policy makers and practitioners on opportunities to improve the efficiency and effectiveness of transportation services. The ever present cost pressures continues to justify an ongoing focus on cost indicators. More limited efficiency indicators are presented in this report than previously due to the reduction in survey responses. However, several indicators are provided to the extent that data permitted.

The survey was conducted in conjunction with the Michigan Department of Education and Management Partnership Services, Inc.

Survey Results

The results of this survey were derived from two primary data sources:

- The 20010 – 2011 SE-4094
- The 2013 Transportation Benchmarking Survey

The SE-4094 is submitted annually by school districts across Michigan. It includes data on transportation costs, service volumes (number of buses, total miles traveled, and students

transported), and personnel data. The transportation survey was conducted in June 2013. The survey collected data on the number of bus trips, fleet maintenance staffing, service delivery type, and transportation policy information. All of the analyses presented below represent a blend of regular education and special education costs and resources requirements, except where noted.

Of the 575 local education agencies and intermediate school districts who submitted results for the SE-4094, 84 (14 percent) responded to the survey. The responding districts represented 23 percent of all transportation costs, 25 percent of all buses driven across the state; and 26 percent of total students transported. The following tables summarize the responses by the number of students transported and the size of the bus fleet.

Table 1: Responses by number of students transported

Students Transported	Respondents	% of Total[1]
<=1000	28	33%
1,001 to 2,000	29	35%
2,001 to 3,000	10	12%
3,001 to 4,000	6	7%
4,001 to 5,000	5	6%
5,001 to 6,000	2	2%
6,001 to 7,000	1	1%
7,001 to 8,000		0%
>=8,001	3	4%
Total	**84**	

Table 2: Responses by fleet size

Fleet Size	Respondents	% of Total
<= 25	44	52%
26 to 50	25	30%
51 to 75	4	5%
76 to 100	4	5%
>=101	7	8%
Total	**84**	

Overall, the “typical” district that responded to the survey was a district operated transportation program that expended approximately $2.0 million utilizing 36 buses in a single bell system and transported slightly more than 2,200 students. These values indicate that survey respondents are

[1] Percentages may not add to 100 due to rounding.

slightly larger than, but still reasonably comparable to, statewide data available in the SE-4094 that indicated average expenditures of $1.1 million and used 21 buses to transport 1,267 students.

Structure of the report

The remainder of the report is organized in order to allow it to be comparable to previous surveys released by MSBO. The initial section provides the transportation related indicators calculated as part of this and other surveys. The indicators presented include:

- Cost per rider
- Cost per bus
- Buses per 100 students
- Capacity utilization
- Runs per bus

The second section provides indicators related to fleet management and maintenance practices. Within this section, the following indicators are included:

- Buses per technician
- Vehicle equivalent units per technician
- Fleet age and mileage

The report continues to provide both average and median values for each metric where possible. As has been identified in previous reports, the average represents the arithmetic mean of all values in the set. This value is very sensitive to the influence of very large or very small relative values in the set and would, if looked at in isolation, provide an incomplete and potentially inaccurate perception of performance in the specific areas. In order to understand whether very large or small values were impacting the average, the median value was also calculated where the data provided allowed. The median represents the point where exactly half of the values in the set would be smaller and half would be larger than this value. The median is not impacted by the extremely large or small values in the set and presents a reasonable representation of the "average" value of a group of data, provided that most of the values are clustered around the median. In addition to the current year values, analyses from the previous three surveys over the last five years are presented to provide additional insight into the results.

Transportation Operations Indicators

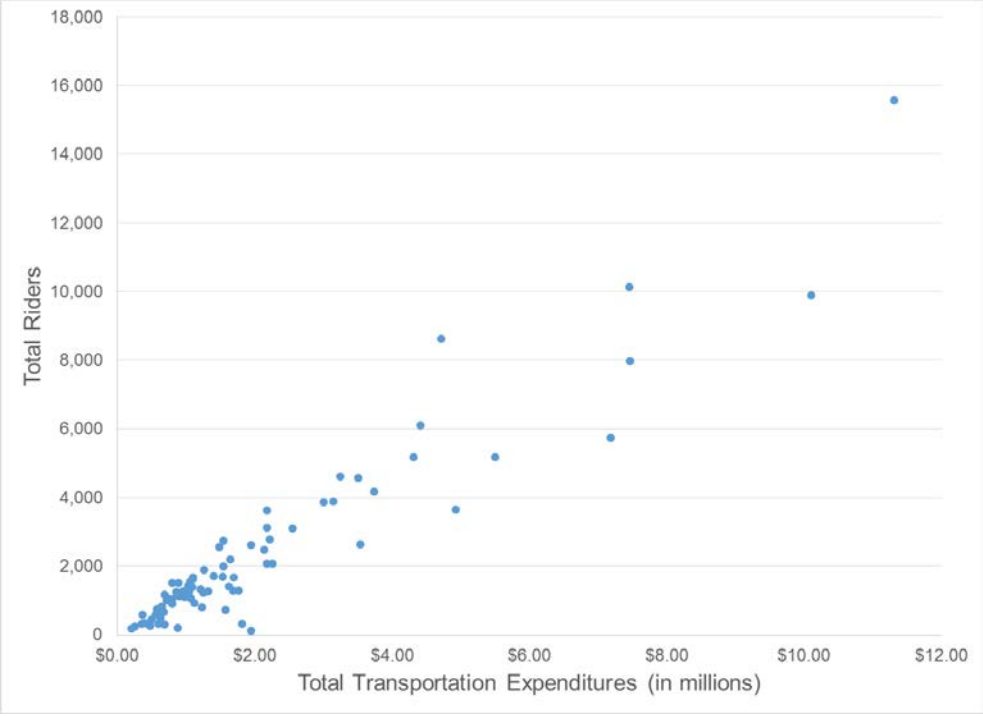
Transportation expenditures are driven by a complex interaction of controllable and un-controllable factors such as the effects of topography, student density, traffic, board policies, school locations and bell times. Designing a routing scheme that efficiently and effectively delivers services within these constraints requires balancing the number of students who ride a given bus and how many times that given bus is used throughout a service day. An operation that is able to design bus runs and routes to transport more students on fewer buses will generally, all other factors being equal, have lower costs than its peer organizations. Therefore, fully understanding transportation requires an understanding of both cost and operational performance.

The survey evaluated two key cost-related metrics (cost per rider and cost per bus) and two routing related metrics (buses used per 100 riders and daily runs per bus). These four metrics and the additional survey data provide insight into the cost of services for a variety of student groups. From these results it is possible to identify the impact of various routing strategies on costs and service.

Cost per rider

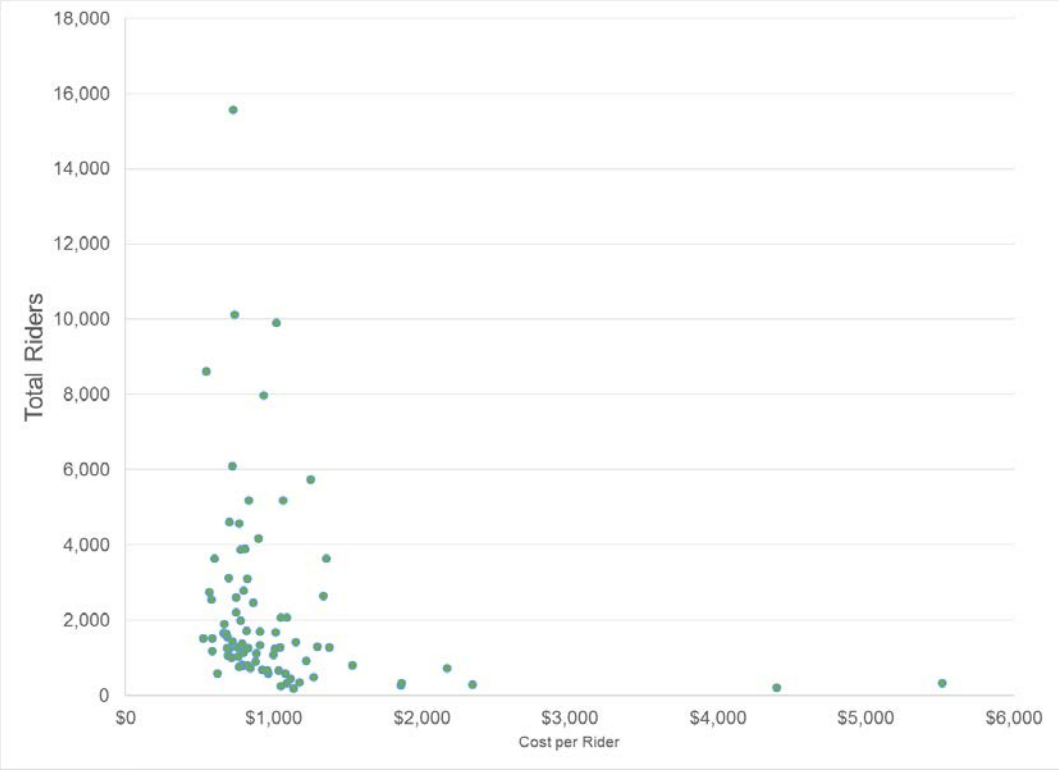
It is not unexpected that as the number of students being transported increases, the total expenditures associated with transportation increase. This relationship is evident in the chart below that shows total transportation expenditures relative to the number of students being transported for the respondents to the survey.

Figure 1: Total transportation expenditures relative to total riders



Transportation operations are in the business of moving students efficiently and effectively. In order to assess efficiency, cost per rider is the critical measure that provides insight into routing efficiency and cost control mechanisms. In an environment where a variety of routing techniques are used to transport the maximum number of students in the fewest number of buses, we would expect to see a decreasing unit cost (cost per rider in this case). However, the cost per rider chart below does not provide clear evidence of this decreasing cost per student as the number of riders increases.

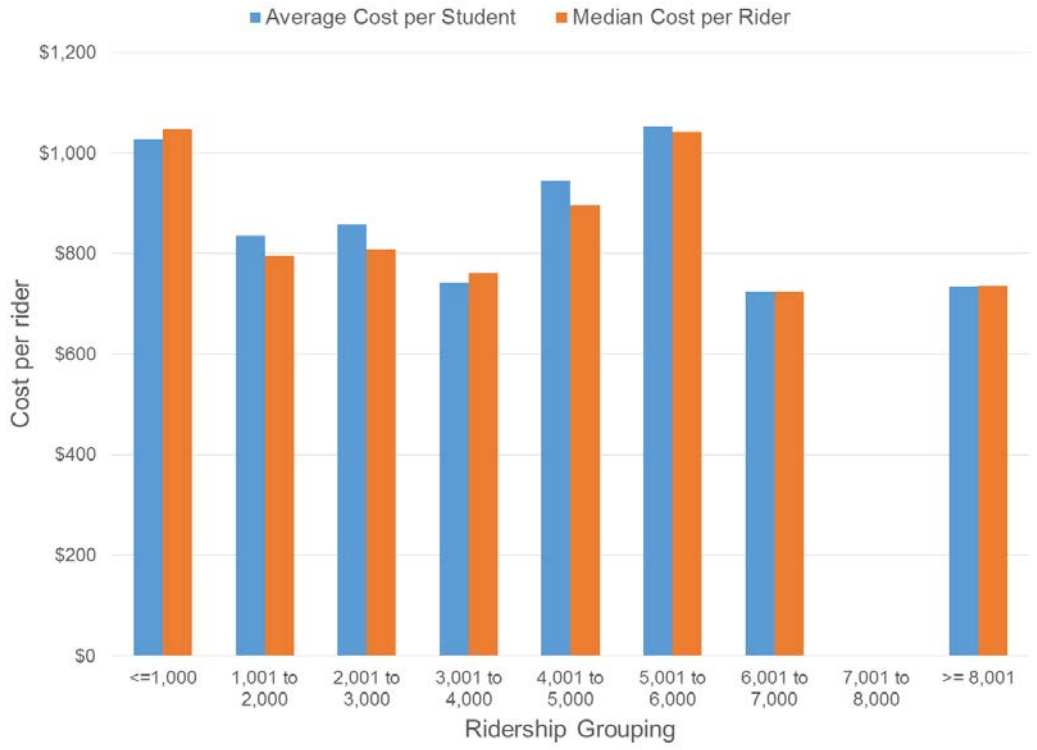
Figure 2: Cost per rider



As has been the case in previous surveys, the expected "downhill" relationship between increased riders and cost per rider is not evident in the results. The small size of the operations that have responded to the survey are likely having an impact on the ability to implement operating techniques that would increase efficiency.

When respondents are grouped by the total number of riders it does appear that smaller operations have higher average costs per rider. These results are similar to the 2007 and 2009 results. The overall survey average cost per student was $877 and the median cost per rider was $831. Figure 3 below shows average and median cost per rider by number of riders.

Figure 3: Average and median cost per rider grouped by rider count



Despite the more limited responses provided in this survey, significant differences continue to be present in both service type and region. The table below shows the average and median costs for regular education, special needs, and overall transportation costs by region.

Table 3: Cost per rider by region

Region	Count of responses	Regular Education		Special Education		All Transportation[2]	
		Average	Median	Average	Median	Average	Median
Upper Peninsula	4	$789	$835	$4,834	$4,916	$874	$918
Northern Lower Peninsula	8	$927	$955	$12,828	$7,041	$1,173	$1,063
Western	22	$737	$750	$2,689	$4,885	$795	$822
Thumb and surrounding area	11	$686	$699	$2,003	$5,851	$803	$776
South central	13	$606	$660	$10,509	$9,174	$808	$727
Southeast	26	$656	$693	$5,982	$7,949	$915	$946
Survey Totals	**84**	**$684**	**$738**	**$5,313**	**$6,022**	**$877**	**$831**

[2] All Transportation represents the combined totals of regular and special education transportation.

Table 3 indicates a continuing shift in the location of the highest cost region of the State. Of particular note is the significant cost of special needs transportation in the South Central region. Also of note is the $370 per rider range in the high ($1,173 per rider in the Northern Lower Peninsula) to low ($803 in the Thumb and surrounding areas) average values for All Transportation. It is important to consider that the $370 per rider value is significant in that it can represent a $814,000 range in transportation costs for the average district responding to the survey ($370 per rider multiplied by the average rider count of 2,200).

Cost per Bus

Cost per bus analyses are generally conducted to evaluate the efficacy of changing service providers. Typically, when school districts release a Request for Proposal for transportation services, the pricing mechanism used is a cost per bus based on some unit of services (i.e., cost per day, cost per hour, and cost per block of hours). The increase in the percentage of contracted services has made understanding the cost of operating an individual school bus an increasingly relevant concern for operations across the state.

The 2009 survey indicated a significant increase (24 percent on the average cost and 14 percent on the median cost) in per bus costs. However, this survey indicates a nearly 10 percent reduction in the average and median costs per bus over the 2009 results. The cause of this reduction is not clear, but it is likely the result of a combination of efficiency efforts and cost reductions associated with regular education transportation. Tables 4 and 5 below summarize the cost per bus by region and the cost per rider by ridership grouping, respectively.

Table 4: Cost per bus by region

Region	Responses	Regular Education		Special Education		All Transportation	
		Average	Median	Average	Median	Average	Median
Upper Peninsula	4	$47,061	$41,553	$68,649	$79,458	$48,860	$40,362
Northern Lower Peninsula	8	$48,846	$36,221	$98,181	$101,804	$55,096	$40,603
Western	22	$45,324	$46,903	$55,148	$59,615	$46,152	$47,237
Thumb and surrounding area	11	$47,269	$50,057	$54,598	$53,362	$48,719	$47,090
South central	13	$47,445	$44,314	$71,570	$57,298	$52,101	$49,612
Southeast	26	$53,037	$53,302	$66,448	$69,451	$56,682	$59,493
Survey Totals	**84**	**$49,365**	**$47,743**	**$66,659**	**$60,011**	**$52,829**	**$50,031**

Table 5: Cost per bus by ridership group

Number of Riders	Responses	Regular Education		Special Education		All Transportation	
		Average	Median	Average	Median	Average	Median
< =1,000	28	$46,130	$39,683	$69,375	$55,794	$52,303	$43,956
1,001 to 2,000	29	$46,906	$48,088	$59,576	$58,147	$48,168	$47,090
2,001 to 3,000	10	$45,620	$47,840	$58,136	$53,140	$47,527	$51,044
3,001 to 4,000	6	$53,203	$51,634	$66,225	$69,451	$55,615	$54,663
4,001 to 5,000	5	$49,450	$59,226	$75,993	$79,363	$54,800	$63,283
5,001 to 6,000	2	$67,920	$72,216	$68,564		$68,015	$68,339
6,001 to 7,000	1	$51,589		$45,989		$49,639	
7,001 to 8,000							
> = 8,001	3	$53,514	$57,827	$69,968	$74,775	$58,460	$62,667
Survey Totals	**84**	**$49,365**	**$47,743**	**$66,659**	**$60,011**	**$52,829**	**$50,031**

One item of note in these figures and tables is the relative shift in the highest cost groups. The difference between the Southeast region and the rest of the State has narrowed noticeably in this survey for the first time. Additionally, the shift in highest costs away from the largest operations (in terms of both riders and buses) to more middle size organizations is unique to this survey. Whether this is reflective of the sample of districts included in this survey or some larger trends will be an issue requiring on-going assessment.

Buses per 100 riders

One measure that combines the principles associated with filling and reusing a bus is to evaluate the number of buses required to transport 100 riders. The principle of this measure is that in order to transport 100 students with one or fewer buses, it will be necessary to establish a multi-tier system that allows a bus to be reused. In addition, it would be necessary to place a sufficient number of students on the bus. Consequently, if a district were able to average 1.0 to 1.25 buses or less to transport 100 students it would be an indication of both effective capacity utilization and asset reuse.

Similar to the previous surveys, the respondents indicated that a two tier bell structure that transports elementary school students by themselves and middle and high school students together is the most common structure. Also evident is that the smallest systems use a single tier structure while the largest systems use a three tier structure. Consequently, it could be expected that larger operations would have the lowest buses per 100 rider values because they have the most opportunity to reuse assets and the smallest should have the highest values.

Figure 4: Buses per 100 students by region

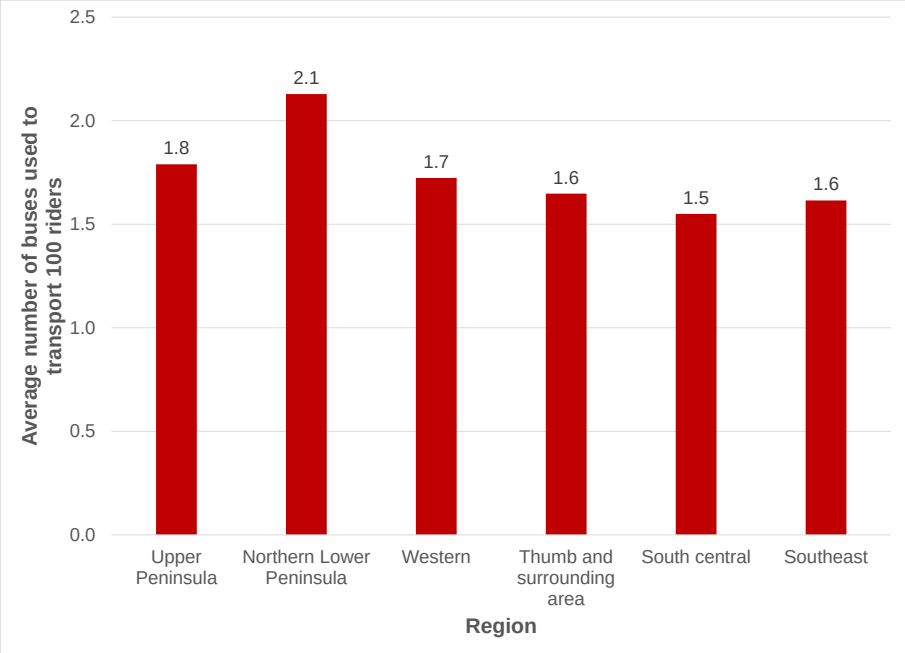


Figure 5: Buses per 100 students by ridership grouping

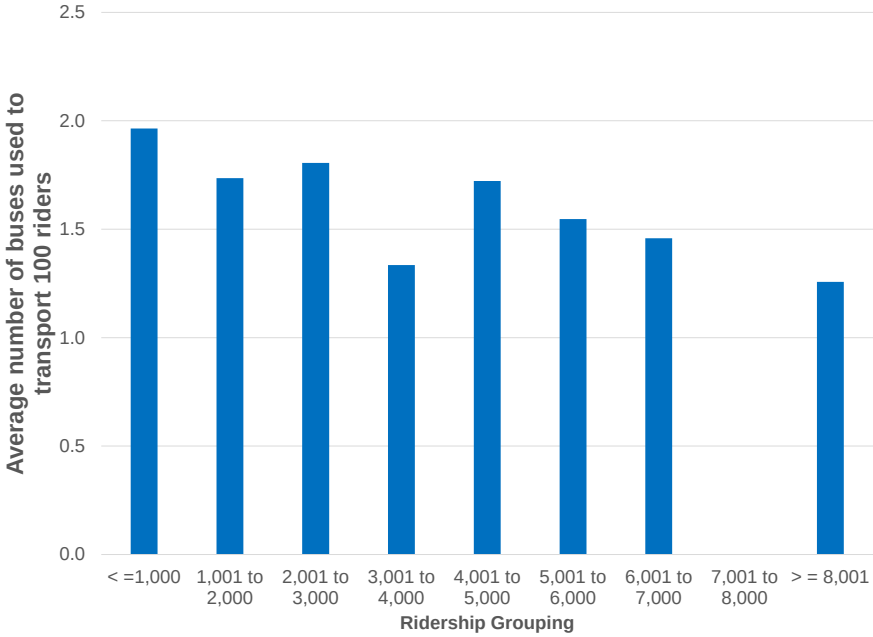
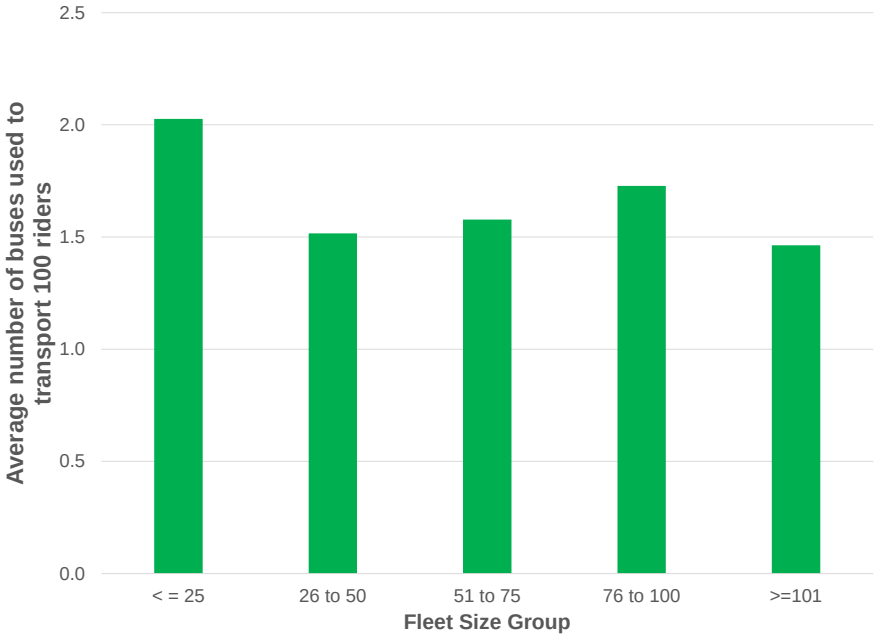


Figure 6: Buses per 100 students by fleet size grouping



Keeping in mind that a lower value indicates greater efficiency, the figures above offers a number of interesting insights. In the 2013 survey the average buses per 100 students is 1.7, which is exactly the same value as was identified in 2011. In addition, the regional, fleet size and ridership grouping values remain consistent with 2011 values. This seems to indicate some stability in operations after a more volatile two year period between 2009 and 2011.

Daily Runs per Bus

The number of runs a bus can perform in a day is generally limited by the type of bell structure in place at a given school district. A total of 71 respondents provided data on their bell structure. The results indicated that as in 2011 the two most common structures are a single tier structure (where all students from all grades ride together) and a two tier structure (where high school and middle school students ride together and elementary students ride separate). What was particularly interesting about this response is that zero districts reported that Kindergarten through high school students rode the bus together. This is dramatically different than the 28 percent of respondents, including districts from across all regions of the State, who reported that they used this routing structure in the 2011 survey. The cause of the dramatic shift is partially related to the mix of districts responding to the survey. However, this indicator will be an item to watch in the future to determine if it represents a more fundamental shift in how districts across the state are approaching the mixing of students. The table below summarizes the type of routing structure by region.

Table 6: Routing structure by region

Region	HS & MS ride together; ES separate	HS separate; MS & ES ride together	All grades ride separately	K-12 ride together
Upper Peninsula	4			
Northern Lower Peninsula	6	1		
Western	4	12	2	
Thumb and surrounding area	4	4		
South central	3	6		
Southeast	4	4	17	
Grand Total	**25**	**27**	**19**	**0**

In school districts where all students ride together, the maximum number of trips a bus can perform per day is, generally, two (one in the morning and one in the afternoon). In school districts where elementary, middle, and high schools ride separately, the maximum number of trips a bus can perform is six (three in the morning and three in the afternoon). While there are a number of variations on this theme, it is important to understand that this measure looks at the *total* runs a bus performs for home to school trips in a given day. Maximizing the use of the asset throughout the day is a key routing challenge and a significant indicator of overall efficiency.

A total of 79 respondents provided sufficient data to analyze the average number of trips per bus. The following tables summarize the average number of runs each bus is performing by fleet size and region.

Table 7: Average runs per bus by fleet size

Fleet Size	Average Runs Per Bus Per Day			
	2013	2011	2009	2007
< = 25	2.2	2.2	2.1	2.1
26 to 50	2.5	2.7	2.4	2.3
51 to 75	3.0	3.0	3.4	3.2
76 to 100	2.5	2.3	4.4	3.7
>= 101	4.5	3.4		4.8
Survey Total	**2.6**	**2.5**	**2.6**	**2.5**

The responses have historically indicated that larger fleets have had more opportunities to pair bus runs together to achieve multiple trips during the day. The responses also indicate a substantial degree of stability in the average number of runs per bus across most fleet sizes, with the exception of the 76 to 100 bus grouping. In this grouping the values have ranged 2.3 to 4.4 over the four surveys. The reason for this volatility in this grouping is not well understood based on the current or previous survey responses.

Table 8: Average runs per bus by region

Region	Average Runs Per Bus Per Day			
	2013	2011	2009	2007
Upper Peninsula	2.8	2.1	1.6	2.4
Northern Lower Peninsula	1.7	1.5	1.4	2.0
Western	2.4	2.7	2.7	2.6
Thumb and surrounding area	2.4	1.9	2.4	2.2
South central	1.5	2.2	2.7	2.0
Southeast	3.5	2.6	3.1	4.0
Survey Total	**2.8**	**2.6**	**2.6**	**3.1**

Two particular items of note are apparent in the above table. The first is the dramatic increase in trips per bus for districts responding from the Upper Peninsula and the second is the significant drop in runs per bus in the South central region. Further analysis of the individual responses seems to indicate that this is due more to the mix of districts responding to the 2013 survey rather than a fundamental shift in either expectations or approach. The continued volatility in the annual results is an indication that transportation managers should use this information cautiously. For any individual district, consistent measurement of their specific capacity use number will provide more nuanced insight into relative efficiency changes and the impact on operational cost and effectiveness.

Transportation Management Practices

The 2013 survey continued a practice begun in 2011 that captures data on a select number of operational concerns in order to gain additional insight into the transportation landscape. For the 2013 survey, we have continued to emphasize the design of transportation organizations and the use of transportation technology. Organizational design is a topic that had not been addressed in any previous survey while the impact of routing software was first considered in the 2009 survey.

Transportation organizational structure

In order to provide comparability to previous surveys the 2013 version focused on three primary positions: transportation manager, dispatcher, and router. The intention was to identify the prevalence of these positions within different types of operations and how, in the absence of these positions, organizations were providing these services.

Of the 84 respondents, 63 (75 percent) indicated that they had an individual dedicated to the management of transportation. It continues to be the case that the smallest of operations (those less than 25 buses or transporting fewer than 1,000 riders) generally do not have dedicated managers. In addition to whether there was a dedicated manager, the survey solicited information on years of experience in transportation. The table below summarizes the responses.

Table 9: Summary of years of experience

Years of experience in transportation	2013	2011
1 to 3	20%	13%
4 to 6	11%	8%
7 to 10	8%	13%
11 to 15	11%	16%
More than 15	50%	50%
Survey Total	**100%**	**100%**

It is clear from the response that there remains a long standing base of experience across the state. However, it does appear that there is a shift in the distribution of experience as mid-career managers appear to be declining. This represents a long term concern for districts as it is unlikely that the requirement to oversee transportation will disappear, but it appears that individuals with expertise in the area are being reduced. Developing the next generation of transportation managers will be an important challenge.

Designated dispatcher and router positions continue to be far more limited across the survey respondents. It continues to be the case that the development and management of bus routes, the key driver of transportation costs, remains a highly distributed activity across all regions and district sizes. Districts should continue to assess whether dedicated attention to these critical management functions would yield savings that would justify increasing the presence of dedicated staffing.

The use of transportation technology

The presence of routing software continues to be significant in the survey respondents. A total of 73 percent of the respondents indicated that they had routing software in use. What was particularly interesting about this mix of survey respondents is that almost 50 percent of the responding districts indicating they owned routing software had 25 buses or less. Additionally, all of the respondents who indicated fleet sizes of 51 or greater owned routing software.

The 2013 survey results continued to indicate a positive relationship between cost and efficiency and the availability of routing software. In this version of the survey, the smallest fleets were focused on given the significant proportion of respondents indicating the availability of software. The table below summarizes key cost and operational statistics for these fleets based on the availability of routing software.

Table 10: Routing software availability in fleets of 25 or fewer buses

Routing Software Available	Count	Average number of riders	Average cost per bus	Average cost per rider	Average trips per bus	Buses per 100 students
No	18	659	$42,505	$1,003	2.0	2.4
Yes	26	1,375	$49,860	$956	2.4	1.9

This data indicates that even in smaller operations the simple availability of routing software has led to increased efficiency. One particular item of note is the higher cost per bus for those operations with routing software. While initially this would appear to be inefficiency, it is actually the opposite. In operations using fewer buses to provide the same level of services, there are fewer buses to amortize costs over. Therefore, cost per bus is often higher while cost per student is lower.

Survey responses to questions about camera availability continue to demonstrate that purchasing strategies continue to be essentially all or nothing propositions. The table below demonstrates the percent of each individual respondent's fleet that is equipped with cameras.

Table 11: Camera availability

Percent of camera availability within fleet	Count of respondents
None	16
1 to 10%	8
11 to 25%	0
26 to 50%	2
51 to 75%	4
76 to 100%	36

In the 2013 survey, very few districts reported the availability of automated vehicle locating (AVL) systems. Commonly referred to as GPS, it is clear that this is still an evolving tool in the state.

Only 30 respondents indicated any availability of AVL and of these 30, 19 indicated that the entire fleet was equipped. Similar to cameras, it appears that districts are taking an all or nothing approach to the acquisition of this technology.

For districts not reporting camera or AVL availability but desiring their implementation, the feasibility of a progressive purchasing strategy to make these technologies available could be considered. This could allow districts who otherwise cannot afford a one-time purchase to outfit the fleet to gradually obtain the operational and risk management benefits associated with the availability of these tools.

Fleet Management Indicators

Issues associated with the management of school buses and administrative support vehicles have been consistently noted in previous surveys. Particular concerns about the continued age of the fleet and the availability of fleet maintenance technicians have been identified. This survey indicates that districts should continue to consider these concerns. Survey data was used to calculate two key measures that assist in the evaluation of the appropriateness of maintenance staffing. Buses per technician and vehicle equivalent units (VEU) per technician are presented as they have been in the past for maintenance assessments Fleet age analysis was also conducted to understand fleet replacement practices.

Buses maintained per technician

The survey provided 60 usable responses to evaluate the number of buses maintained per technician. The results indicate that the trends identified in 2011 continue to be maintained. Particular pressure is present in the average results for the Western, South central, and Southeast regions. Based on comparisons with historical respondents, this does not seem to be due to changes in the mix of districts responding. The following tables summarize the average number of buses maintained per technician by region and fleet size.

Table 12: Buses maintained per technician by region

Region	Average buses per technician			
	2013	2011	2009	2007
Upper Peninsula	18	17	33	12
Northern Lower Peninsula	23	22	21	17
Western	32	27	20	18
Thumb and surrounding area	17	19	15	15
South central	36	30	17	17
Southeast	32	27	18	19
Grand Total	**29**	**25**	**19**	**17**

Table 13: Buses maintained per technician by fleet size

Bus Group	Average buses per technician			
	2013	2011	2009	2007
< = 25	29	20	17	14
26 to 50	30	28	22	19
51 to 75	21	23	20	22
76 to 100	33	22	18	19
> =101	28	33		21
Grand Total	**29**	**25**	**19**	**17**

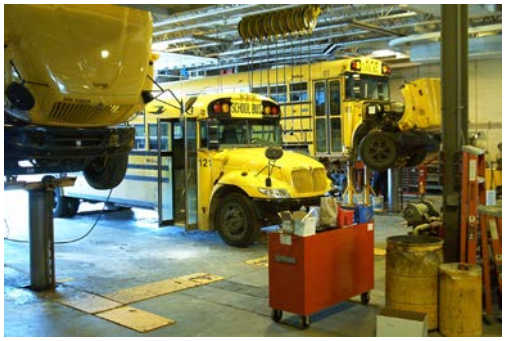
Once again the districts responding to the survey have indicated that fleet maintenance services continue to become increasingly difficult to provide. The continued growth of buses maintained

by each technician remains a long-term concern that districts must consider in their operational planning.

Vehicle equivalent units maintained per technician

Fully analyzing the appropriateness of maintenance staffing requires a consideration of other vehicles and equipment that technicians must maintain. Typically, these include administrative sedans, pickup trucks used for buildings and grounds operations, grounds maintenance equipment, and large trucks. The most common method in the maintenance industry to evaluate the supply of mechanics necessary to maintain the demand presented by a fleet of vehicles and equipment is through the use of a concept known as vehicle equivalent units. This concept was originally developed by the United States Air Force and relates all vehicles to a standard, baseline unit. The baseline unit used is the average aged administrative sedan. The sedan is given a value of 1.0 vehicle equivalent unit (VEU) and all other vehicles and equipment are compared to this value. For purposes of the analysis of survey results, the following values were utilized:

- Auto – 1.0 VEU
- Pickup – 1.5 VEU
- Large Truck – 2.5 VEU
- Miscellaneous equipment - 0.75 VEU
- School Buses – 3.7 VEU



Industry data indicates that one full time equivalent technician should be able to maintain approximately 100 to 125 vehicle equivalent units. This is equal to one technician maintaining approximately 27 to 34 school buses, a value that remains consistent with the average buses per technician of 29 calculated in the Buses per Technician section. The following tables summarize the results of the survey by fleet size and region.

Table 14: Vehicle Equivalent Units per technician by fleet size

Bus Group	Average VEU per technician			
	2013	2011	2009	2007
< = 25	115	87	78	58
26 to 50	120	112	94	80
51 to 75	91	85	81	91
76 to 100	127	97	78	90
>= 101	108	136		84
Grand Total	**114**	**102**	**83**	**77**

Table 15: Vehicle Equivalent Units maintained per technician by region

Region	Average VEUs per technician			
	2013	2011	2009	2007
Upper Peninsula	75	79	95	56
Northern Lower Peninsula	89	87	91	74
Western	127	109	99	80
Thumb and surrounding area	69	76	72	60
South central	138	117	93	72
Southeast	125	112	87	79
Grand Total	**114**	**102**	**83**	**77**

Once again the sample group of districts responding to the survey indicate that school district maintenance operations continue to shrink the number of fleet maintenance technicians they employ. An ongoing caution regarding the impact of deferred maintenance and fleet maintenance services must continue to be considered. Additionally, a focus on maximizing the efficiency of existing maintenance operations will be increasingly important.

Fleet age and use

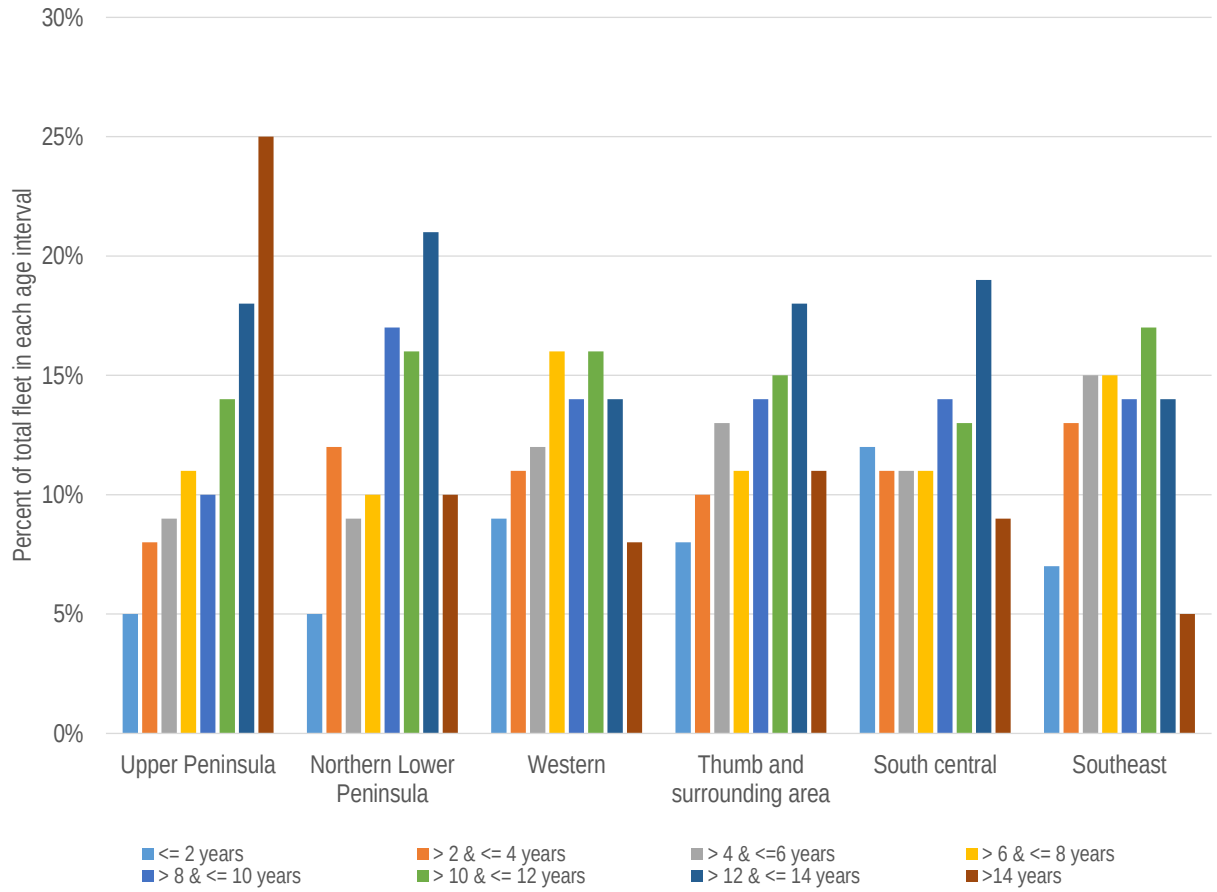
For the first time, the survey is incorporating data available from the SE-4107 fleet inventory report in addition to survey data collected on mileage distributions. This data continues to indicate that an aging fleet continued to be a concern across the state. However, it appears that the rapid aging of the fleet has stabilized, but still remains a significant issue across the State. The following table summarizes the age distribution of the fleet by region. The age where at least 50 percent of the fleet is highlighted as it indicates the average fleet age for that region.

Table 16: Fleet age distribution

Region	Percent of all vehicles at or under the age interval							
	2	4	6	8	10	12	14	15+
Upper Peninsula	5%	13%	22%	33%	43%	57%	75%	100%
Northern Lower Peninsula	5%	17%	26%	36%	53%	69%	90%	100%
Western	9%	20%	32%	48%	62%	78%	92%	100%
Thumb and surrounding area	8%	18%	31%	42%	56%	71%	89%	100%
South central	12%	23%	34%	45%	59%	72%	91%	100%
Southeast	7%	20%	35%	50%	64%	81%	95%	100%

The data indicates that average fleet age across the state is now slightly greater than 9 years. This implies an average retention period of 18 years, which is significantly greater than the 12 to 15 period recommended by the National Association of State Directors of Pupil Transportation Services. When evaluated in a different format the regional challenges of fleet replacement become more obvious. Figure 7 below shows the proportion of the fleet in each region that is within the established age intervals.

Figure 7: Fleet age by region



From this viewpoint the fleet replacement challenges in the Upper Peninsula and the Northern Lower Peninsula regions become clearer. These regions have significant proportions of their fleets that are 12 years old or greater. More importantly, the unbalanced distribution of the fleets across the age ranges in these regions indicate the likelihood of immediate term issues with fleet replacement financing and fleet maintenance costs. The concerns are not as significant yet for districts in the Thumb and South Central regions. However, if actions are not taken in the near term these districts will be facing challenges similar to those in the Upper and Northern Lower Peninsula regions.

The fleet data available in the SE-4107 indicates that many districts across the State are on the verge of a crisis related to fleet replacement. The growing scarcity of qualified fleet maintenance staff and the systemic breakdown of capital replacement practices will result in significant cost increases with decreases in fleet safety and reliability unless this issue is addressed. Districts must actively manage the interaction between the aging of the fleet and the continued reduction in fleet maintenance resources. Potential strategies to address these concerns include evaluating alternative financing mechanisms for fleet replacement and the use of alternative fleet maintenance providers to help minimize service interruptions likely with older fleets.

Appendix 1 – Regional Groupings of Intermediate School Districts

Region 1 - Upper Peninsula
COPPER COUNTRY ISD
EASTERN UPPER PENINSULA ISD
DELTA SCHOOLCRAFT ISD
DICKINSON-IRON ISD
GOGEBIC ONTONAGON ISD
MARQUETTE ALGER ISD
MENOMINEE ISD

Region 2 - Northern Lower Peninsula
ALPENA-MONTMORENCY-ALCONA ESD
CHARLEVOIX EMMET ISD
CLARE GLADWIN ISD
COOR ISD
COP ISD
IOSCO RESA
MANISTEE ISD
MASON LAKE ISD
MECOSTA OSCEOLA ISD
NEWAYGO COUNTY ISD
OCEANA ISD
TRAVERSE BAY ISD
WEXFORD MISSAUKEE ISD

Region 3 - Western
ALLEGAN COUNTY ISD
BARRY ISD
BERRIEN ISD
IONIA COUNTY ISD
KALAMAZOO RESA
KENT ISD
LEWIS CASS ISD
MONTCALM AREA ISD
MUSKEGON ISD
OTTAWA AREA ISD
ST. JOSEPH ISD
VAN BUREN ISD

Region 4 - Thumb and surrounding areas
BAY ARENAC ISD
GENESEE ISD
GRATIOT-ISABELLA ISD
HURON ISD
LAPEER ISD
MIDLAND ISD
SAGINAW ISD
SANILAC ISD
SHIAWASSEE RESD
ST. CLAIR ISD
TUSCOLA ISD

Region 5 - South Central
BRANCH ISD
CALHOUN ISD
CLINTON ISD
EATON ISD
HILLSDALE ISD
INGHAM ISD
JACKSON ISD
LENAWEE ISD
LIVINGSTON ESA
MONROE ISD

Region 6 - Southeast
MACOMB ISD
OAKLAND ISD
WASHTENAW ISD
WAYNE RESA

Appendix 2 – 2013 MSBO Student Transportation Benchmarking Survey Questions

MSBO 2013 Student Transportation Benchmarking Survey

1. Background Information

The survey is designed to minimize the amount of redundant effort required to compile and submit transportation information. Much of the information being requested is currently included in the SE-4094 and SE-4107 forms now being submitted to the State, and should require less than one hour to complete. Questions or concerns regarding the survey can be directed to Tim Ammon of MPS at 888-518-3377 extension 702 or to tammon@mpsconsultant.com.

We are collecting information on both ISD and school district operations, so the first question you will be asked will direct you to the appropriate survey.

Please note that all questions marked with an asterisk require answers for you to be able to continue on with the survey.

1. What type of entity do you represent?

- ◯ Local Education Agency / K-12 School district
- ◯ ISD, ESA, etc

MSBO 2013 Student Transportation Benchmarking Survey

2. School District Operations

Please provide us with some basic information on your school district. Note that this information will be used only to contact you in the event that there is a question about your information. Survey results will in no way identify any individual district.

***1. Please enter the name of your district.**

***2. What is your district number?**

***3. Please tell us about yourself. We will only use this information to validate the responses to the survey and address any questions.**

What is your name?	
What is your email address?	
What is your phone number?	

MSBO 2013 Student Transportation Benchmarking Survey

3. Transportation Policies

Please tell us about the policies you must operate within.

1. Please indicate which of the following policies and procedures have been formally documented and adopted by your school district. Check all that apply

- [ ] Eligibility for transportation services
- [ ] Walk to bus stop distances
- [ ] Maximum student ride times
- [ ] Accident and/or incident management
- [ ] Inclement weather management
- [ ] Student discipline
- [ ] Bus idling
- [ ] Bus stop location
- [ ] Alternative address transportation allowances (e.g., from daycare centers, joint custody)
- [ ] Use of cell phones and/or electronic devices
- [ ] Courtesy transportation

2. What are your planning guidelines for seating students on buses?

- ◯ Three students per seat regardless of grade
- ◯ Two students per seat regardless of grade
- ◯ Three elementary or middle school students per seat; two high school students per seat
- ◯ Three elementary students per seat; two high school or middle school students per seat

Other (please specify)

3. What kind of bus routing structure do you have?

- ◯ Kindergarten through high school students can ride together
- ◯ High school and middle school ride together; elementary school rides by themselves
- ◯ High school rides by themselves; middle school and elementary school ride together
- ◯ High school, middle school, and elementary school all ride by themselves

Other (please describe your routing structure)

4. The following question is based on established guidelines or policies within your district. If you do not have an established guideline please leave the box empty.

Please indicate the maximum amount of time students can ride the bus by grade or student type as established in existing guidelines or policies. Please enter the value in minutes.

Elementary school students	
Middle School students	
High school students	
Out of district students	
Special needs students	

MSBO 2013 Student Transportation Benchmarking Survey

4. Transportation Organizational Structure

This section is designed to collect information on how you provide transportation services.

***1. Does your district have an individual EXCLUSIVELY dedicated to manage transportation? Please answer yes if this person is responsible for functions such as developing bus routes, managing bus drivers, and establishing transportation budgets.**

- ◯ Yes
- ◯ No

MSBO 2013 Student Transportation Benchmarking Survey

5. Other Departments

1. What other departments or functions does the individual responsible for transportation oversee?

MSBO 2013 Student Transportation Benchmarking Survey

6.

1. How many years of experience does the individual managing transportation operations have in transportation?

	1 to 3	4 to 6	7 to 10	10 to 15	More than 15
Years of experience	◯	◯	◯	◯	◯

2. Do you have a designated dispatcher position? Answer yes only if there is a person in your organization whose primary function is related to dispatch. If the answer is no, please describe who performs dispatch functions in the box below.

◯ Yes

◯ No

If there is no designated dispatcher, who provides the dispatch function?

3. Do you have a designated router position? Answer yes only if there is a person in your organization whose primary function is to develop bus routes. If the answer is no, please describe who performs the routing function in the box below.

◯ Yes

◯ No

If there is no designated router, who develops the bus routes?

MSBO 2013 Student Transportation Benchmarking Survey

7. Transportation System Design

The following questions will gather information about how your transportation operation is designed.

***1. How do you provide transportation services?**

Check all that apply.

- [ ] Using district owned buses
- [ ] Using contracted buses
- [ ] Using a mix of district owned and contracted buses

MSBO 2013 Student Transportation Benchmarking Survey

8. Contracting question

Please tell us about your outsourced program.

***1. In what year did you begin using a contractor to provide services? Please enter the value as a four digit year.**

***2. What percentage of your transportation operation is outsourced?**

- ◯ Less than 10%
- ◯ 10 to 25%
- ◯ 25 to 50%
- ◯ 50 to 75%
- ◯ 75 to 99%
- ◯ 100%

3. How has the proportion of your operation that is contracted changed since July 2009?

- ◯ The contracted proportion of the operation has INCREASED since July 2009
- ◯ The contracted proportion of the operation has DECREASED since July 2009
- ◯ The contracted proportion of the operation has REMAINED THE SAME since July 2009

MSBO 2013 Student Transportation Benchmarking Survey

9. Regular Education Transportation Operations

***1. How many REGULAR EDUCATION students do you transport using the following service providers:**

District resources	
Contractor	
ISD	
Other	

***2. How many schools of each type do you transport to?**

Include all in district and out of district schools for both regular students.

High schools	
Middle/Junior High Schools	
Elementary schools	
Other schools (i.e., charter, non-public)	

***3. Do you use bus routing software to design your bus runs?**

- ◯ Yes
- ◯ No

***4. How many bus runs do you have for all regular education, special needs, and out of district programs?**

This information must be calculated by the district. The total runs should include all runs throughout the day including morning, noon, and afternoon. However, this should not include any athletic runs or extracurricular runs. A bus run is considered an individual bus trip where students are picked up from one location and dropped off at one location. In the case of combination runs where students are picked up and delivered to one or more nearby schools, this should be counted as one (1) run.

Example 1: When a bus leaves the garage in the morning, picks up a load of high school students, and drops them off at their school that would equal one (1) run. When it departs the high school and picks up a load of middle school students and drops them off at school that would equal one (1) run. When it departs the middle school and picks up a load of elementary school students and drops them off at school that would also equal one (1) run. Therefore, this bus would have three (3) runs that are counted.

Example 2: A bus leaves the garage in the morning and picks up a load of high school students and a load of middle school students. It then drops the high school students off on one campus and the middle school students on another campus. This combination of schools would equal one (1) run.

5. Do you use any of the following techniques to design your bus runs and routes? Check all that apply:

- [ ] Route pairing - Assigning bus runs together sequentially to a bus or bus route. Also called “tiering”.
- [ ] Combination runs - A single bus run used to transport students from different schools to multiple school destinations.
- [ ] Shuttle runs - A bus run that loads students arriving from other buses at a common collection point or hub (usually a school), and takes them directly from that point to their destination school or schools.

MSBO 2013 Student Transportation Benchmarking Survey

10. Special Education Transportation

Please provide the following information on how you provide transportation for special needs students.

1. How many SPECIAL EDUCATION students do you transport using the following service providers:

District resources	
Contractor	
ISD	
Parent	
Other	

2. What routing techniques are used to increase the efficiency of special needs services?

	Yes	No
Special needs students ride on regular education buses	◯	◯
Regular education students ride on designated special needs buses	◯	◯
Special needs students ride on buses with students from other school districts	◯	◯

*3. Does the transportation department have a formal role in evaluating transportation options or costs for special needs students?

◯ Yes

◯ No

If yes, please briefly describe the role of transportation.

MSBO 2013 Student Transportation Benchmarking Survey

11. Fleet Information

Please tell us about your school bus fleet and other district vehicles your staff maintains.

***1. Please provide the number of buses (a combined total of district owned and contractor owned buses, if appropriate) in each of the following age groups. Information only on buses that are active route buses should be included. Spare buses are not to be included.**

In calculating the age of the vehicle subtract the current year from the year of purchase value (YOP) that is reported on the SE-4107 report for vehicle inventory. For this survey please use 2010 as the base year, therefore the formula would be:

2010 – Year of Purchase = Age group vehicle would be included in.

Less than 3 years old	
4 to 6 years old	
7 to 9 years old	
10 to 12 years old	
13 to 15 years old	
More than 15 years old	

***2. Please provide the number of buses you have in each of the following mileage groups. This should be a combined total of district owned and contractor owned if some or all of your operations are contracted.**

Please provide information only on buses that are active route buses. Spare buses are not to be included. For purposes of reporting mileage, please utilize a meter reading taken between November 1, 2010 and today's date.

Less than 30,000 miles	
30,000 to 59,999 miles	
60,000 to 89,999 miles	
90,000 to 119,999 miles	
120,000 to 149,999 miles	
More than 150,000 miles	

***3. What is the rated capacity of your school bus fleet?**

This information should include data on active route buses only from form SE-4107. The value included in the cell should equal the sum total of rated passenger capacity for each category of transportation.

For example: If a district has a total of 10 buses that are rated at 72 passengers each, the value entered in the cell would be 720.

4. What percentage of your school district's buses are equipped with on-board cameras? Please count only buses where cameras are actually installed. Buses with dummy boxes but without permanent installations should not be included in your count.

	None	1 to 10%	11 to 25%	26 to 50%	51 to 75%	76 to 100%
Percent of fleet with cameras	◯	◯	◯	◯	◯	◯

5. What percentage of your school district's buses are equipped with GPS or AVL technology?

	None	1 to 10%	11 to 25%	26 to 50%	51 to 75%	76 to 100%
Percent of fleet with GPS or AVL	◯	◯	◯	◯	◯	◯

12. Transportation Department Staffing

1. Please indicate the number of full time equivalent positions you have for each of the following groups.

The data requested in this section is intended to address frequent questions regarding the appropriate size of maintenance staffing plans. Therefore, it is requested that each district review its fleet maintenance operation and provide information on the number of full time equivalent positions (defined as at least six (6) hours per day) in each of the following categories:

Technicians - For the purpose of this analysis, technicians are considered to be any staff member whose primary responsibility is the repair and maintenance of school buses and support equipment. Examples of FTE counts include technicians and lead technicians who actually perform maintenance services; and mechanics helpers who may provide oil change services.

Parts staff – For the purpose of this analysis, parts staff are considered to be individuals whose primary responsibility is the procurement and management of vehicle maintenance inventory items. This may include fractional full-time equivalent positions for technicians who order their own parts, fractional portions of warehouse staff who manage central stores items, or individuals who have full time vehicle maintenance inventory management responsibilities.

Other maintenance staff – For the purpose of this analysis, other maintenance staff are considered to be individuals with responsibilities related to vehicle maintenance and management. This category would include individuals whose primary responsibility is to fuel vehicles and mechanics helpers who do not actually perform maintenance services.

Technicians	
Parts staff	
Other maintenance staff	

2. The data requested in this section is intended to identify additional maintenance services that are provided by school district fleet/equipment maintenance staff. Please tell us how many of the following vehicle types you maintain.

Automobiles	
Pickups	
Vans	
Large trucks	
Miscellaneous equipment	

MSBO 2013 Student Transportation Benchmarking Survey

13. Driver Information Questions

MSBO is interested in providing its members with an understanding of the state of driver shortages around the state. The next several questions will be designed to assess specific concerns related to drivers.

1. Describe the status of your driver work force.

◯ No driver shortage

◯ Limited shortage that causes limited service disruptions (3 or fewer times per week routes require accommodation due to driver shortages)

◯ Significant shortage that causes frequent service disruptions (more than 5 times per week routes require accommodation due to driver shortages)

2. Do you measure any of the following to evaluate the your driver recruiting requirements?

☐ Driver conversion rate – how many drivers apply for a job versus how many are hired

☐ Driver turnover rate – the number of drivers who leave service in a given year divided by the total number of drivers required daily

☐ Absenteeism – the percent or number of drivers that do not appear for their routes daily

☐ Driver continuity – the average number of drivers assigned to a given route over a defined period of time

☐ Driver tenure – the average length of time a driver has been employed

☐ Other (please describe any other measures you use)

MSBO 2013 Student Transportation Benchmarking Survey

14. ISD/ESA Operations

Please provide us with some basic information on your ISD/ESA. Note that this information will be used only to contact you in the event that there is a question about your information. Survey results will in no way identify any individual district.

*1. Please enter the name of your ISD/ESA.

*2. What is your ISD/ESA number?

*3. Please tell us about yourself. We will only use this information to validate the responses to the survey and address any questions.

What is your name?

What is your email address?

What is your phone number?

*4. What types of services related to transportation does the ISD/ESA provide? Check all that apply.

- [ ] Transporting special needs students
- [ ] Transporting Head Start or Early Intervention students
- [ ] Facilitating joint contracting for transportation services, but not actually providing the service
- [ ] Facilitating other joint purchasing efforts such as fuel, repair parts, technology, drivers, etc

Other (please describe any other transportation-related services you provide)

*5. Since 2009, has the range of services you provide:

- ◯ Expanded
- ◯ Contracted
- ◯ Remained approximately the same

15.

1. Please describe what other services you have expanded into.

MSBO 2013 Student Transportation Benchmarking Survey

16. ISD/ESA transportation operations

***1. How many individuals work directly in the provision of transportation services at the ISD/ESA? Please round to the nearest 0.5 FTE**

***2. Does your district have an individual EXCLUSIVELY dedicated to manage transportation? Please answer yes if this person is responsible for functions such as developing bus routes, managing bus drivers, and establishing transportation budgets.**

- ◯ Yes
- ◯ No

MSBO 2013 Student Transportation Benchmarking Survey

17. Other Departments

1. What other departments or functions does the individual responsible for transportation oversee?

MSBO 2013 Student Transportation Benchmarking Survey

18. Experience and Positions

1. How many years of experience does the individual managing transportation operations have in transportation?

	1 to 3	4 to 6	7 to 10	10 to 15	More than 15
Years of experience	◯	◯	◯	◯	◯

2. Do you have a designated dispatcher position? Answer yes only if there is a person in your organization whose primary function is related to dispatch. If the answer is no, please describe who performs dispatch functions in the box below.

◯ Yes

◯ No

If there is no designated dispatcher, who provides the dispatch function?

3. Do you have a designated router position? Answer yes only if there is a person in your organization whose primary function is to develop bus routes. If the answer is no, please describe who performs the routing function in the box below.

◯ Yes

◯ No

If there is no designated router, who develops the bus routes?

***4. How do you provide services?**

◯ The ISD/ESA owns the assets

◯ The ISD/ESA has contracted for the assets

◯ There is a mix of ISD/ESA assets and contracted assets

MSBO 2013 Student Transportation Benchmarking Survey

19. ISD Contracting

1. What percentage of your transportation operation is outsourced?

- ◯ Less than 10%
- ◯ 10 to 25%
- ◯ 26 to 50%
- ◯ 51 to 75%
- ◯ 76 to 99%
- ◯ 100%

20. ISD/ESA Fleet Information

Please tell us about your school bus fleet.

***1. Please provide the number of buses (a combined total for ISD/ESA-owned and contractor owned) in each of the following age groupings. Information only on buses that are active route buses should be included. Spare buses are not to be included.**

In calculating the age of the vehicle subtract the current year from the year of purchase value (YOP) that is reported on the SE-4107 report for vehicle inventory. For this survey please use 2010 as the base year, therefore the formula would be:

2010 – Year of Purchase = Age group vehicle would be included in.

Less than 3 years old	
4 to 6 years old	
7 to 9 years old	
10 to 12 years old	
13 to 15 years old	
More than 15 years old	

***2. Please provide the number of buses you have in each of the following mileage groups. This should be a combined total of district owned and contractor owned if some or all of your operations are contracted.**

Please provide information only on buses that are active route buses. Spare buses are not to be included. For purposes of reporting mileage, please utilize a meter reading taken between November 1, 2010 and today's date.

Less than 30,000 miles	
30,000 to 59,999 miles	
60,000 to 89,999 miles	
90,000 to 119,999 miles	
120,000 to 149,999 miles	
More than 150,000 miles	

***3. What is the rated capacity of your school bus fleet?**

This information should include data on active route buses only from form SE-4107. The value provided should equal the sum total of rated passenger capacity for each vehicle used for transportation. Do not include spots available for wheelchair positions. The only value that should be included relates to the number of seating positions.

For example: If a district has a total of 10 buses that are rated at 72 passengers each, the value entered in the cell would be 720.

21. ISD Use of Technology

1. Do you use routing software to manage the bus routes?

- [ ] Yes
- [ ] No

2. What percentage of your school district's buses are equipped with on-board cameras? Please count only buses where cameras are actually installed. Buses with dummy boxes but without permanent installations should not be included in your count.

	None	1 to 10%	11 to 25%	26 to 50%	51 to 75%	76 to 100%
Percent of fleet with cameras	◯	◯	◯	◯	◯	◯

3. What percentage of your school district's buses are equipped with GPS or AVL technology?

	None	1 to 10%	11 to 25%	26 to 50%	51 to 75%	76 to 100%
Percent of fleet with GPS or AVL	◯	◯	◯	◯	◯	◯

MSBO 2013 Student Transportation Benchmarking Survey

22. Thank you

Thank you for participating in the 2011 MSBO Transportation Survey. If you have questions about the survey please feel free to contact Scott Little at MSBO (slittle@msbo.org) or Tim Ammon from MPS (tammon@mpsconsultant.com).