SPECIFICATION COMPARISON : 29,000 TO 32,000 GVW CAB CHASSIS 7 CUBIC YARD WATER LEVEL DUMP BODY

Wayne M. Layman, P.E., (Retired) *Mississippi State Highway Department*

Standardization of equipment used for maintenance of highways by the states, provinces, and territories has been discussed for several years as a method to achieve lower initial cost due to volume purchases and to provide industry with a standard model to bid. Fleet standardization was one of the main topics at the first meeting of the Southeastern State Equipment Managers in 1987 in Montgomery, Alabama. The southeastern member states decided the best approach to fleet standardization was to investigate what the states were actually purchasing. To do this, each state agreed to do a specification comparison of a particular item of equipment and report on the results at the annual Equipment Managers Meeting. The information received from the member states revealed that we were close to standardization for horsepower, weight, and dimensions with variations for optional equipment required by each state. This I think this is due to the similarity in industry manufacturing models of equipment, federal regulations controlling what industry can manufacture, and competition that provides the states with a common base product or item of equipment from which they can specify. It is unlikely that specification writers minds run along the same parallels as much as they are specifying what is available on the market.

I chose twelve (12) components of a 29,000 to 32,000 GVW, 7 cubic yard dump truck for comparison. I had to read some specifications four times before I found where the paint color or axle capacity or other components were hidden in the specification. I feel that industry contributes to this confusion by not listing their truck components in the same order. Trying to interpret their data books these days is a challenge. Requests for specifications were mailed to 61 states, provinces, and territories. Forty-seven (47) replies (77%) were received. A summary of the specification comparison is given below by component.

GVW AND CAB-AXLE DIMENSION

3 specified less than 29,000 GVW	6%
19 specified 29,000 to 32,000 GVW	40%
21 specified more than 32,000 GVW	44%
3 did not specify GVW	6%
2 furnished only body specs	4%
48	100%

In reviewing the GVW's specified, the three less than 29,000 GVW did not use the truck for snow plowing and three of those specifying over 32,000 GVW (Alabama, Florida, and Hawaii) were not in snow states. Of the 19 in the 29,000 to 32,000 GVW range, 11 were specified in states that have little or now snowfall. In summation, the specs indicate that the GVW and the body size specified are determined by the combination of use of snowplows, and sand or slag spreaders.

Of the Cab-Axle (C.A.) specified, six were 72 inches, 22 were 84 inches, one was 96 inches, eight were 102 inches, one was 108 inches, two were 120 inches, one was 138 inches, and seven did not specify a C.A. dimension. The C.A. dimension has a direct correlation to the size of the dump body desired.

ENGINE

Type

43 specified diesel	90%
1 specified gasoline	2%
2 did not specify type	4%
2 furnished only body specs	4%
48	100%

Horsepower

Diesel

1 specified 165 HP	2%
2 specified 170 HP	4%
1 specified 175 HP	2%
1 specified 176 HP	2%
1 specified 180 HP	2%
6 specified 185 HP	13%
1 specified 190 HP	2%
1 specified 195 HP	2%
3 specified 200 HP	7%
3 specified 205 HP	7%
10 specified 210 HP	21%
2 specified 220 HP	4%
1 specified 227 HP	2%
1 specified 230 HP	2%
2 specified 235 HP	4%
4 specified 240 HP	8%
1 specified 260 HP	2%
1 specified 270 HP	2%
1 specified 325 HP	2%
1 specified 125 KW	2%
1 did not specify HP	4%
2 furnished only dump body spec	4%

Gasoline

1 specified 231 HP	2%
48	100%

From the tabulation of horsepower specified, industry will meet or exceed just about any horsepower specified. The torque range ran from nothing specified by 11 to a high of 1250 ft-lbs. In matching engines and transmissions, torque is more important than horsepower and controls the size transmission required.

AXLE CAPACITY AND MAXIMUM SPEED

22 axle cap. specified equaled GVW specified	46%
19 axle cap. specified exceeded GVW specified	40%
5 did not specify axle cap. or GVW capacity	10%
2 furnished only dump body specs	4%
48	100%

In order for industry to meet federal regulations in certifying GVW ratings, tires, wheels, axles, suspension and frame must be considered. You must have axle capacities at least the same as GVW specified. In most cases where axle capacities exceed specified GVW, the tires are the controlling factor that establishes the GVW rating. Thirty of the specs received specified maximum speed in a range of 55 to 66 mph. A few of the states are still specifying axle ratios but I found it a costly way that can get a spec writer in trouble.

BRAKES

43 specified air	90%
3 specified hydraulic	6%
2 furnished only dump body specs	4%
48	100%

In reading trade magazines, I note that some manufacturers are going to air over hydraulic brake systems.

CAB

43 specified conventional cab tilt hood	90%
2 specified conventional cab	4%
1 did not specify	2%
2 specified only dump body specs	4%
48	100%

Of the specs requiring tilt hood, 19 specified fixed grills and the rest specified butterfly hood, butterfly access or alligator style.

FRAME

Section Modulus (SM), Yield Strength (PSI) & Resisting Bending Moment (RBM)

1 specified SM	2%
5 specified SM & PSI	10%
9 specified SM & RBM	19%
7 specified PSI & RBM	15%
4 specified SM, PSI & RBM	8%
15 specified RBM	32%
1 specified PSI	2%
1 could not interpret	2%
2 did not specify	4%
2 furnished only dump body specs	4%
2 specified to meet GVW	2%
48	100%

Section Modulus Specified (SM), cubic inch

12.53, 13.42, 13.50, 13.60, 14.00, 15.00, 15.00-18.00, 15.90, 17.60, 18.00, 20.00, 23.30, 27.75, 30.00

Yield Strength Specified (PSI), pounds per square inch

50,000; 110,000

Resisting Bending Moment Specified (RBM)

670,000; 850,000; 852,000; 900,000; 915,000; 916,000; 1,000,000; 1,100,000; 1,170,000; 1,180,000; 1,300,000; 1,378,000; 1,400,000; 1,500,000; 1,600,000; 1,700,000; 1,749,000; 2,000,000; 2,290,000: 2,500,000; 2,563,000

These listed variations indicate to me that each spec writer is specifying a certain frame. I have always tried to specify the heaviest frame I could get on the model truck that met GVW requirements.

TRANSMISSION

13 specified automatic	27%
24 specified manual	50%
2 specified automatic-manual optional	4%
7 specified manual-automatic optional	15%
2 furnished only dump body specs	4%
48	100%

The percentages indicate that 31% specify automatic transmissions with 15% not being convinced that automatics are the way to go. As indicated by the spec comparison, the ratio of automatic to manual is about

50/50. Personally, I think automatic is the only way to go.

TIRES

1 specified 10:00x20 - 12-ply	2%
1 specified 11:00x20 - 14-ply	2%
1 specified 10R20 - 14-ply	2%
2 specified 10R22.5 - 12-ply	4%
2 specified 10R22.5 - 12-ply F - 14-ply R	4%
19 specified 11R22.5 - 14-ply	40%
9 specified 11R22.5 - 16-ply	19%
1 specified 11R22.5 - 14-ply F - 16-ply R	2%
3 specified 11R22.5 - 16-ply F - 14-ply R	7%
1 specified 12R22.5 - not specified	2%
1 specified 12R22.5 - 16-ply	2%
1 specified 275/80R22.5 - 14-ply	2%
1 specified 315/80R22.5 - 18-ply front 11R22.5 - 16-ply rear	2%
1 specified 315/80R22.5 - J front 12R22.5 - 16-ply rear	2%
1 specified 315/80R22.5 - J front 11E22.5 - rear	2%
1 specified first line quality radial-14ply	4%
2 furnished only dump body specs	4%
48	100%

Specifications indicate that all but two (2) states are using radials. Various combination of tires, sizes, and plys are specified as a result of individual use of trucks, etc. Snowplows require heavy tires on the front - others are specified only to meet GVW requirements of the truck.

WHEELS

27 specified disc	56%
18 specified cast spoke	38%
1 could not interpret	2%
2 furnished only dump body specs	4%
48	100%

Fifty-six percent of the spec writers are specifying disc wheels. If you've ever tried to true a rim on a spoke wheel with a piece of chalk and a jack, outside in 99° degree heat, you would never again specify a spoke wheel. They are a standard on most trucks and therefore cheaper but I'm sure the labor cost of maintenance quickly exceeds any initial savings derived.

DUMP BODY
CUBIC YARD WATER LEVEL CAPACITY

1 specified 3.00 Cu. Yd. W/L	2%
1 specified 3.50 Cu. Yd. W/L	2%
10 specified 4.00 Cu. Yd. W/L	21%
1 specified 4.73 Cu. Yd. W/L	2%
18 specified 5.00 Cu. Yd. W/L	38%
3 specified 6.00 Cu. Yd. W/L	6%
2 specified 6.50 Cu. Yd. W/L	4%
5 specified 7.00 Cu. Yd. W/L	11%
2 specified 8.00 Cu. Yd. W/L	4%
1 specified 10.42 Cu. Yd. W/L	2%
1 specified 3660 mm	2%
3 did not specify size	6%
48	100%

Specifications indicate that snow states use a smaller capacity dump body to prevent overloading the truck when it has a snowplow. Specs also indicate the odd capacities are from states designing their own body. One spec calls for a stainless steel tail gate, another requires an aluminum tail gate, for ease of removal I guess, and one specifies corten steel. Most snow states require rust proofing.

CENTRAL HYDRAULICS

27 specified central hydraulics	56%
20 did not specify central hydraulics	42%
1 could not interpret	2%
48	100%

All of the states specifying central hydraulics receive their winter rains as snow, freezing rain or sleet.

PAINT COLOR

14 specified orange	29%
16 specified yellow	34%
2 specified green	4%
4 specified white	8%
1 specified state buff	2%
1 specified white/blue body	2%
2 specified yellow/black body	4%
3 specified yellow-black hood	7%
1 specified orange-black hood	2%
1 specified manufacturers standard color	2%
1 to be specified after award of bid	4%
2 not specified	4%
48	100%

This is one that gives industry fits. It does not appear there is any two states that accept the same color unless it's manufacturers standard colors. The general opinion is that maintenance workers need equipment painted a color to help identify a work zone or zone of caution. I think there should be uniformity whatever the color chosen.

NUMBER PAGES OF SPECIFICATIONS

3 had	3 pages
2 had	4 pages
1 had	5 pages
2 had	6 pages
3 had	7 pages
2 had	8 pages
2 had	9 pages
1 had	12 pages
1 had	13 pages
2 had	14 pages
2 had	15 pages
2 had	16 pages
2 had	17 pages
2 had	18 pages
1 had	20 pages
1 had	21 pages
1 had	22 pages
2 had	23 pages
2 had	31 pages
2 had	32 pages
1 had	34 pages
1 had	42 pages
1 had	43 pages
1 had	45 pages
1 had	46 pages
1 had	64 pages
1 had	67 pages
1 had	75 pages
1 had	89 pages
1 had	158 pages
2 had	16 pages dump body specs only

CONCLUSION

In reviewing the specs, it is evident that states requiring snowplows, central hydraulic system sanders and spreaders have to have more pages of specs than southern and Sun Belt states. The large number of pages also indicates to me the spec writer is trying to be assured he is delivered a truck that meets his requirements totally because he has no control over the award of bids or he has been burnt in the past. Not having control over the award of a bid is aggravating, getting burnt is a learning experience. If industry was not trying to get a price advantage, a truck spec could only consist of 7 to 10 lines.

We each have to spec what we think best fits our needs and within the confines of what industry is willing to build. We can't get standard within the six Districts in Mississippi - to be standardized in North America is a dream.