

New Tools Bring Bonus Ops to Paving Contractors

For paving contractors, the word “density” is probably as familiar as that first cup of coffee in the morning. Followed by two other key words that will guide him or her through the day: “bonus” and “penalty.”

Unlike any other contractor in the world of construction, the paving contractor probably faces more stressful situations on a day to day basis than any other. Nothing worse than a paver screed failure or a plugged roller spray nozzle with a load of hot mix asphalt in the hopper. Or a road surface that’s paved, rolled and striped that fails to impress the inspector. Along with a host of other on-site, plant- or weather-related disruptions, comes the dreaded penalty for failure to deliver on time or failure to deliver consistent density across the length and width of the mat.

The flip side of this story is “bonus,” a tantalizing incentive for any paving contractor worth his bitumen. To enjoy bonuses, as many contractors do these days, the paving team must morph to an orchestra of sorts, with all instruments tuned and ready to go; the music well written and practiced and the orchestra itself confident in the success of the group. Without this orchestration, success – and thus bonus – may be difficult to attain.

Along with the introduction of Superpave and other contemporary mix designs came some nasty roadblocks to bonusland. Like the need to make density before the tender “zone,” a four-letter word connected to the actual temperature of the asphalt mat. Prior to these new super mixes, contractors spent little time analyzing the precise temperature of the mat, and in most cases, didn’t own the equipment to run such tests. Never mind temperature guns. An experienced hand placed briefly on the mat would tell the contractor whether the mix was hot or not. Not so today. Knowledge of the exact temperature is a must throughout the rolling process.

Typical of all asphalt problems of the past, the paving contractors and manufacturers were faced with the task of finding solutions to these new problems. Initially, both worked out new rolling patterns and equipment utilization that primarily focused on adding vibratory rollers prior to and pneumatic rollers following the obstinate tender zone. These were tentative fixes at best that forced the contractors to invest in additional machines and manpower to get the job done. Forget about bonus.

The need was there for the manufacturers to find a more permanent solution to the tender zone problem. A couple of R & D-minded manufacturers jumped into the lead with equipment and instrumentation designed to get the job done faster.

Double drum vibratory asphalt rollers have been the norm since the mid-1970s when states began the change from method-based to end result specifications. Contractors of that era discovered that they could replace roller “trains” of six, eight, twelve or even twenty or more compactors and their operators with a couple of vibratories, saving a ton of money in the process.

Unlike the old static roller, the ground speed of the vibratory was limited by the impact spacing required to meet smoothness and density specs. Roll too fast and the impacts were spread too far apart. Roll too slow and you sacrificed time and thus money. A minimum impact spacing of 10-12 per foot (or about an impact an inch) was, and still is, the rule of thumb required to meet specs. Most all vibratory rollers of that era were designed with eccentric weights that rotated at 2400 vpm. This meant that the roller operator could run at a maximum ground speed of 2.73 miles per hour and maintain the desired impact spacing. With conventional mixes of the day, this posed no immediate problem. Enter Superpave and we have a different story.

About this same time, the introduction of nuclear gauges to measure the density of the asphalt mat brought testing out to the jobsite. These gauges enabled the contractor, an outside testing facility or even the inspector to monitor density as the roller passed. This gauge operator had to be licensed. Calibrated against actual core samples, the nuclear gauge brought very accurate and acceptable readings right to the roller operator enabling the contractor to make adjustments before the mat cooled too much. Calibration and readings were slow to achieve, but with conventional mixes of the day, this posed no immediate problem either. But again, enter Superpave and we have a different story.

Today, with the possibility of the paving and compaction process driven by mat temperature, we have a whole new ballgame. With time now being of the essence, we can no longer expect to obtain compaction and more money using a roller running at 2400 vpm. We can no longer expect to run a profitable paving/rolling operation without an accurate temperature gauge and we can no longer expect to monitor density readings at speeds that will not keep up with today’s high frequency rollers.

Today’s modern paving contractor is equipped not only for getting the job done, but for getting the job done quickly, easily and accurately with

minimal labor and at minimal cost. To the vocabulary of density, smoothness, bonus and penalty, today's contractor almost has to add the word "speed." Without equipment available today and on the drawing board for tomorrow, the asphalt paving contractor will have difficulty getting the job done fast enough to make density, smoothness and money all at once. Let's take a look at what is available today and what we might expect tomorrow that will help us to achieve our goals:

Some of the new group of vibratory compactors that roll faster has been around since ConExpo '99 now and productivity has been well documented. The theory is simple. If the old 2400 vpm roller allowed us to run at maximum of 2.73 mph and make density, we have to add more 2400 vpm rollers and operators to get the Superpave job done before we reach the tender zone. Or we have to add more rollers after the tender zone when the mat cools. Or we have to invest in some rollers that will allow us to flat out roll faster. The new 4000 vpm vibratory rollers will let us achieve density at 4.55 mph, a whopping 66% faster than the old 2400 vpm model. This speed translates directly to the bottom line while saving the contractor equipment and labor costs. Some of the new 4000 vpm models offer optional visual readouts that enable the operator to easily match roller speed to vpm to obtain the desired impact spacing.

Temperature gauges are now available in manually operated "gun" versions which can be walked around the mat for accurate spot tests or in the automatic version that mounts directly beneath the roller with a readout at the operator's station for continual monitoring. These tests are mandatory for Superpave and other mix designs. Both models use basically the same technology. The roller-mounted model costs more but is far more user friendly, is hands free and monitors on the run, with no need for a separate operator. The latter version is mounted on the underside of any old or new roller with kits available to the contractor or mounted directly by the dealer or OEM. You won't have to worry about dropping this one, running it over with the roller or having it stolen while not in use.

New electromagnetic density gauges can also speed up the paving operation. Aside from the cost and safety factors involved in owning, operating, maintaining, storing and disposing of a nuclear gauge, this older technology takes far more time to calibrate and read. The newer electromagnetic models take readings in less than three seconds as opposed to the thirty seconds or more required of the nuclear gauge. No need for the roller operator with his/her 4000 vpm roller to have to wait for the density testing to be completed. Independent accuracy tests have proven the electromagnetic gauge to be equal to or better than the nuclear gauge and a total cost comparison reveals the new concept to be

affordable to every paving operation – without the need for extensive training or annual licensing and service fees.

The electromagnetic gauge also includes a built-in temperature gauge and both temperature and density readings are PC compatible, downloadable and transmittable via GPS systems.

Speed is the key. If contractors are equipped to roll and test faster, they will be ready to win the bonus vs. penalty game. With temperature testing on the run, new high-speed rolling and faster, more accurate density testing, today's paving contractor is well on his/her way to success.

What does the future hold? More of the same. Roller manufacturers are already testing higher frequency models and bringing higher technology options to the jobsite. Electronics will play a bigger part in the rolling operation as highway owners demand better density and smoothness results and more accurate documentation of the same. Look to see a highly accurate, roller-mounted density-on-the-run system in electromagnetic format in the very near future. Look for quick core sample measurements on site. And look to see higher densities coming out of paver screeds as the race to beat the tender zone reaches new levels.