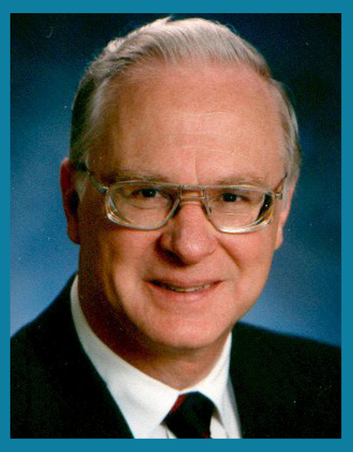
# HIGH DENSITY SAND TRANSPORTER CONQUERS NEW TERRITORY



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## Article Takeaways:

1. High Density Sand Conveying improves core qualities
2. Lower velocities reduce sand grain degradation and pipe wear
3. Eliminating causes of high maintenance lowers unwanted downtimes and production costs

Some time ago a large automotive foundry planned to modernize their core room by investing in 52 new individual batch mixers. For optimum mixed sand quality the mixers were to be positioned above each core machine.

The new system was to replace three large batch mullers with approx. 60 TPH of mixed sand distributed by operator guided monorail cars.

Raw sand supply to the existing large batch mullers was easy. Gravity took care of the sand flow from two 100-ton bins overhead. But how do you feed 52 individual mixers, spread throughout the core room? Gravity alone is no longer enough.

Good question but also a possible stumbling block.

For Klein the answer and recommendation seemed straightforward and based on past experience with similar projects: Install small individual batch mixers above each core machine and High Density pneumatic sand transporter systems to automatically supply raw sand from the two 100-ton bins to small day bins above each mixer. It was a solution proven by many successful installations in the past at similar customers. Granted, none were of the magnitude of this new system but broken into several smaller segments each segment would be well within reason and do-able.

However, no sooner was this solution proposed to the customer before plant and process engineering strongly objected

and rejected the idea. “We already have pneumatic conveyors in our plant and no way are we going to burden ourselves with any more of these units. They are nothing but trouble, always wearing out pipelines and making dust out of perfectly good sand. Maintenance is constantly repairing leaks in the worn out piping and they are down more than we can afford to be. You just have to come up with a better way....”

**Justification for the proposal**

Conventional pneumatic conveyors have been around for a long time and are well known. They operate on the dilute or dense phase method of transporting sand. The dilute and dense phase systems, however, require fluidization and high velocities of the sand in the pipeline.

Higher sand velocities in turn cause higher erosion of the piping and damage the sand grains. It is not uncommon to find dilute and so called dense phase systems with transport velocities approaching 3000 feet per minute and more. The success of these systems depends entirely on keeping the sand in suspension at all times by installing boosters along the pipe run. Because of the excessive velocities required a portion of the material is always pulverized during transport.

**The new High Density System**

In contrast, the High Density transporters, unlike conventional pneumatic conveyors, move the sand in slugs at low velocities. The High Density system does not require fluidization or boosters to move the sand. In fact the sand is pushed in slugs through the pipeline at much lower velocities, typically 100 to 400 feet per minute. High Density systems have already been used in many installations with very good results and the recommendations made to this customer were based on our experience.

What to do? Show me!

All the talk in the world is just hot air, unless you can back it up with proven facts, with actual installations, with satisfied users, people willing to give testimonies as to their experience.

And so we did.

To make a long story short, after extensive investigations, talking and visiting other users and due diligence, plant engineering, the process group and purchasing satisfied themselves that the High Density units proposed indeed were the right choice for them. They gave Klein their go-ahead and a sand distribution system was designed and installed, using 11 Klein High Density transporters to automatically deliver sand to 52 locations. Much time has gone by now and after moving thousands and thousands of tons of sand through the pipelines the customer was still happy and satisfied about the choice they made.

Similar scenarios played out at different times at different locations but always with the same results. The customer, based on ugly experiences, doesn’t like pneumatic conveyors. And you can’t really blame them. Why should anyone spend money on installations that cause more headaches than they are worth.

You may be among many who experienced the downtimes and costs associated with sand lines connected to conventional blow tanks. Sand delivered in tanker trucks are usually unloaded by a short pipe run. Do you keep track of the pipe repairs necessary to keep such systems going?

Each tanker truck is equipped with it’s own compressor and uses the compressed air to fluidize and blow the sand at high velocities into the storage silo or bin. You can probably tell how much dust is generated by this method if the dust collection is not turned on.

Does it have to be this way? Not really.

Pneumatic conveyors, like so many other pieces of equipment used in your foundry, have originally been developed for material transfer in other industries. Flour, lime, clay cement and powders of all kinds are the basic processes where material transfer in pipelines through fluidization was accomplished. These processes have been around for a long time and have become standard applications for pneumatic conveyors. Transferring this technology directly to foundry applications, however, such as moving sand in pipelines, was not necessarily the best idea. Sand is quite abrasive and when fluidized and blown through pipelines, unlike flour or some other powder, will cause nasty surprises.

How can you prevent such surprises?

One way is to stop fluidization and slow the speed of the sand through the pipeline. Let the sand form slugs and use the compressed air to push the slugs through the piping.

Can you visualize the canisters at a bank drive-in? Compressed air actually pushes the canisters through the pipeline connecting the drive-in station with the bank teller.

The same principle works with sand. Now, by not having to fluidize the sand for transport, you can get away with much lower velocities, giving you the overall benefit of reduced pipe wear and hardly any sand degradation. By modifying the concept of dilute or dense phase conveying system to fit your foundry sand application you have in fact designed out the problems that have become so wide spread today.

**High Density System Benefits**

What benefits do you get from the High Density system? Let's summarize:

- No need for fluidization
  - lowers air consumption
- You don't need boosters
  - lowers air consumption and
  - eliminates extra booster piping
- Less pipe wear
  - resulting in reduced repair cost
  - no leaks in the pipeline save compressed air
- Less dust generation
  - improves housecleaning
  - less waste material handling
  - savings in resin - (the more dust in the sand the more resin you need)
- Lower air consumption
  - less compressor energy required
  - lower power costs
- Only minimal maintenance
  - reduces manpower requirements
  - frees up people for other tasks

Are these benefits worth a closer look? Should you investigate the High Density System before buying another conventional pneumatic conveyor?

You decide!

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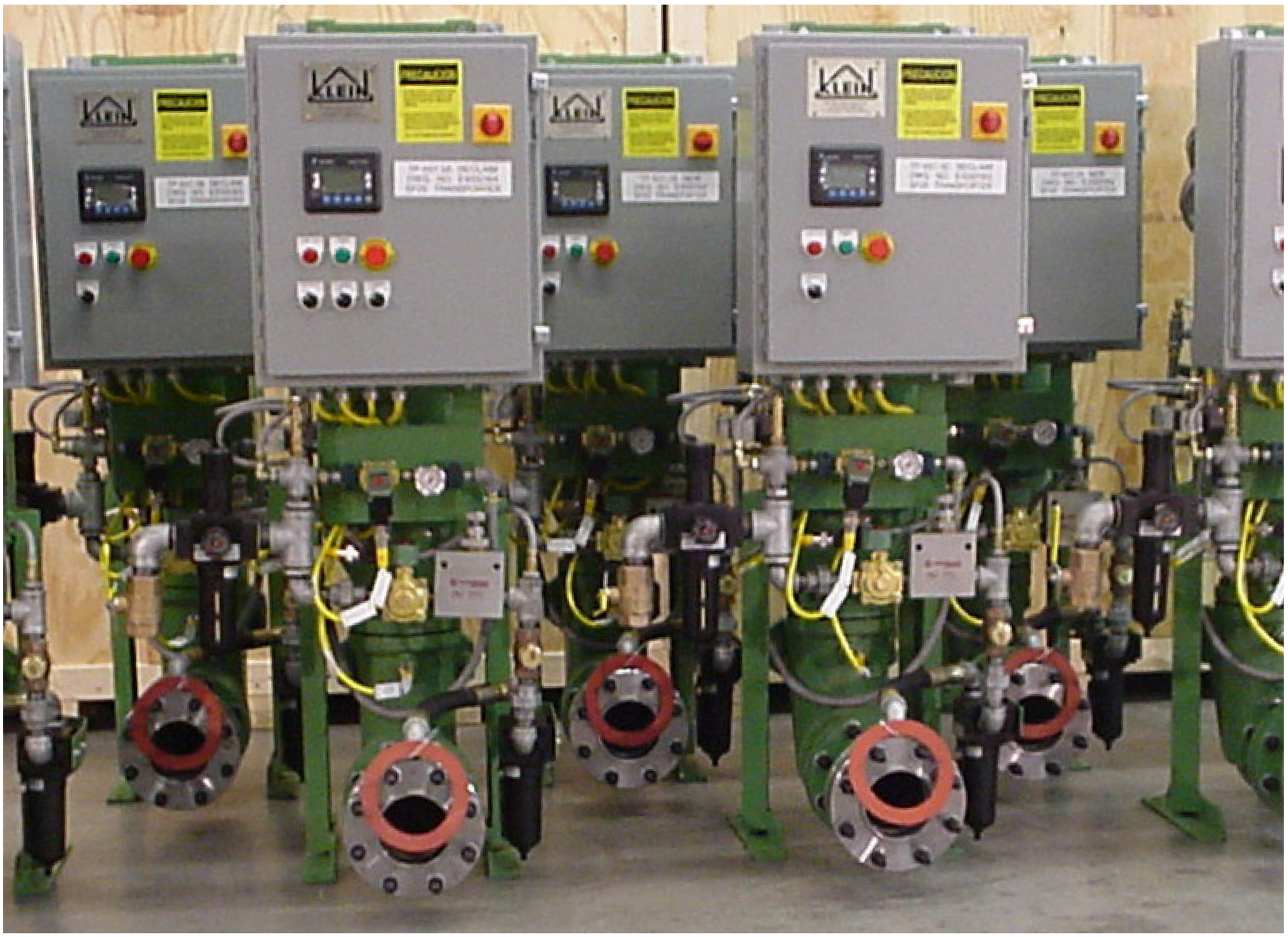

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