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Winter 2007 • News for Team Members of Toyota Motor Manufacturing Canada Inc. • Vol. 20, No. 1

South Paint Shop Enjoys the Sweet Smell of Success Thanks to Green Solution



Noel Butler looks up at the living wall in South Paint that has greatly reduced odours for Team Members working in that area. Above, the scale of the installation is clearly illustrated.

Innovative wall of plants reduces odour in disposal area

The last thing you would expect to see in any area around TMMC is a wall of plants. That's exactly what you'll see when you walk into the paint sludge disposal area in South Paint. The living wall applies hydroponics (namely plants without soil) to clean the air inside the paint recovery room. The wall, first proposed by Noel Butler, Specialist, Manufacturing Engineering, was installed as a kaizen in South Paint by the Engineering Department.

The living wall was part of an overall strategy to reduce internal odour improving the working environment for TMs.

The sludge, unused paint materials, is collected in the room for weekly pickup – approximately 1,200 kilograms. TMMC employs chemical control to minimize bacteria growth and limit odour. However, since the sludge contains water and other elements, low levels of microorganisms still thrive. As a result, the room fills with a sulfur-containing odour. "The fumes aren't toxic but this makes it a somewhat unpleasant atmosphere for team members working in that area," adds Noel.

A living filter

The Engineering team needed to find a way to reduce this odour and maintain clean air levels throughout the entire week as the sludge sat waiting for pick up. The strategy of kaizens included improved chemical control to remove suspended sludge, addition of neutralizing enzymes to further inhibit bacteria growth, and adding the living wall to refresh the indoor air. The Engineering team also began to do some research about reducing the odour and discovered technology utilizing a natural process... nature's way... using plants – essentially a living ecosystem. They had a goal of significantly reducing odour emissions. This plant solution was a perfect fit.

Initially, Noel read about the work NASA had been doing in this area, a world leader in regenerative air technology. He then came upon a program that was already underway at the nearby University of Guelph. They had helped install living wall systems to clean air in offices and schools. A five-storey wall will be installed in the new Cambridge City Hall later this year. However, they had never installed one in an industrial facility. South Paint's wall is the first industrial installation of its kind and a first for a Toyota plant.

"This was a win for all of us," Noel explains adding that the link with the University has provided TMMC with an opportunity to support our community and improve our process. After initiating talks with the University in March, a proposal was drafted up by May. In a few short months, the wall was installed in the sludge area by October and presented to VIP guests at our 20th Anniversary celebration and NAPJM.

Requires minimal resources

The living wall or "biowall" is 10 feet high and 10 feet across and covers about 100 square feet in the sludge disposal area. The plants essentially take in elements that make up the odour and reprocess them, resulting in cleaner air throughout the space.

A biowall also requires minimal resources beyond the plants, light and water. The other necessary elements included a synthetic rooting medium for the plants to support them vertically, a plumbing system to circulate water through the wall, a fan to draw air through the bio-filter and additional lighting.

A vast improvement

It has only been a few months but initial reductions in odour have been beyond initial goals.

This is based on measurements taken by the TMMC environmental group using an outside consultant to measure odour since the wall's installation in October.

Utilizing plants to reduce the odour also has many fiscal and environmental benefits. First, this is a more cost-effective solution since it costs less to have plants clean the air than using machines and fans to exhaust the odour outdoors. It also eliminates the energy used to do so. The wall provides 1,200 cubic feet per minute of fresh air (5% of the air provided by the HVAC units) Plus, the odour is no longer released into the outside air and local community. Waste from the wall is in the form of dead plants. Initially, mortality is high as the plants acclimatize but even when some plants die, they can be composted so no waste product is generated.

To illustrate what the wall does and its benefits, a mini-version has been erected just inside South Paint along with detailed diagrams explaining the process. But even this small living wall is helping to purify the surrounding air.

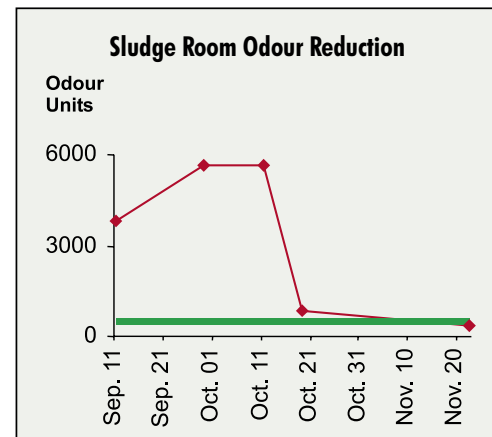
Minimal maintenance

For TMMC, the living wall is simple to maintain. University Grad students come to TMMC twice weekly to monitor the wall. TMs only have to ensure the plants are watered. TMMC is now adding an

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Message from the President

A Year to be Energized and Engaged to Prepare for Future Growth

A new year has arrived. 2007 will be marked by many special events. First, this year marks the 70th Anniversary of Toyota Motor Corporation. Second, over the coming months we will be launching the new Corolla and Matrix. Finally, we will also start



hiring new Team Members for the Woodstock plant. The structure is now on schedule to be completed by the end of the summer and will be followed by the installation of equipment.

Looking back at 2006, we had an amazing year. Sales growth was approximately 13% above the previous year in a declining market. As a result, 2006 was a very busy year for TMMC building a record number of vehicles – just under 320,000. This was done while moving many welding processes to make way for the new welding line to be installed this year.

Team Members make Toyota unique

The media is continually conveying the message that Toyota could surpass GM as the largest automaker in the world. Toyota believes in being a “front runner,” but in terms of quality, environmental technology and safety. We are determined to maximize our contribution to a sustainable society. We understand that the trust and respect by our customers and all other stakeholders is truly the key to our success. This is in line with the TMMC vision “to be the most

admired company, distinguished by our culture and satisfaction of our stakeholders.”

Our Team Members are what makes Toyota unique. Recruiting the best people and training our Team Members to be craftsmen. Our management must be professionals with a deep understanding of the Toyota Way and masters of TPS.

Working hard to get bigger and better

This year we must first build a more robust foundation in preparation for our future growth. Secondly, we must execute all projects effectively and on time. Thirdly, we must embrace innovation and bold reforms to become more competitive. And finally, and most importantly, we must invest in people and in ourselves to be able to grow and prosper.

We are working hard to get bigger and better. We are making history and this is an experience of a lifetime. Our dream is for our Team Members to be energized and engaged by these challenges and to look at them as an opportunity.

Ray Tanguay

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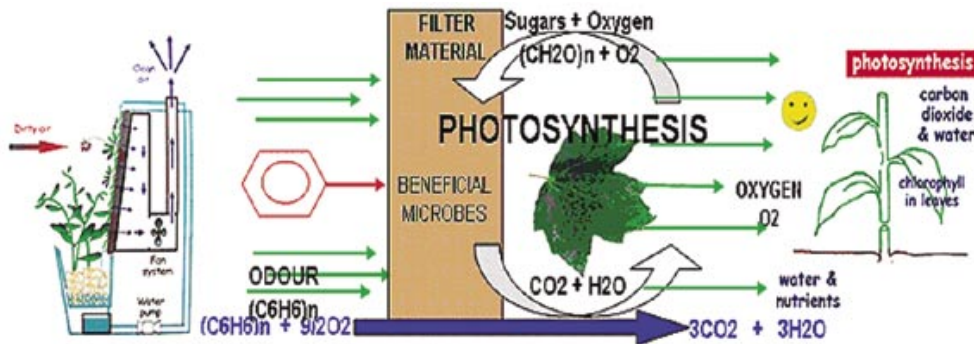
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auto watering feature. The University of Guelph monitors the plants and removes dead ones and plants new ones when necessary. Noel says it has worked out well since Guelph has provided ongoing support for his engineering team on this project.

After the wall has been in place for a year, TMMC engineers will look at its impact and consider installing walls in other areas throughout the plant. A living wall may very well end up in North Paint and in the new Woodstock plant paint area.

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TaktTimes

Takt Times is published quarterly for the Team Members of Toyota Motor Manufacturing Canada Inc.
1055 Fountain Street North
Cambridge, Ontario, Canada
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Specific plants were selected that would thrive and have the most impact on reducing odour.

Another area that may be targeted is the cafeteria. Not only would it look attractive but it would provide fresher air for Team Members.

Don't be surprised if you see a wall of plants in your work area in the near future. This is just another sign of greener manufacturing and TMMC, through this initiative, has played a role in moving this effort forward.

- thanks to Noel Butler for his interview time