success story

Manufacturing Solutions reduces chemical and filtration costs
GMPT Flint, Michigan USA

SUMMARY

Manufacturing Solutions was awarded the Chemical Management contract at GM's greenfield engine plant in Flint, Michigan. During plant ramp-up, problems were encountered with microbial fouling in their high-pressure tanks. These tanks supply specific operations on the cylinder head and block lines. This fouling caused severe plugging of internal suction strainers and resulted in production downtime during a time when increased production was critical.

Manufacturing Solutions and GM decided to evaluate the use of Zeta Rods™ in order to eliminate fouling, manufacturing downtime, and increasing filtration costs. GM purchased 69 Zeta Juniors and installed one in every high-pressure tank. Zeta Rods™ were also installed in the headers of both systems. Manufacturing Solutions managed the project and acted as the liaison between GM and Zeta Corporation.

There was a difficult "burp" phase when the fungus "sluffed off" the tank walls and pipes. Fungus plugged filter elements resulting in downtime while they were cleaned. This phase lasted about 2 months.

Overall, several positive outcomes resulted from the use of Zeta Rods™. Because fungal growth in the high-pressure tanks was eliminated, production downtime was minimized. The fungal reduction reduced maintenance costs and improved operational efficiencies. Chemical usage also dropped, most notably in anti-foam due to the change in surface tension caused by Zeta Rods™. **This anit-foam reduction alone provided an annual cost savings of $120,000.**

BACKGROUND

The Lamb transfer line at the GM Flint Engine, South facility was designed to use auxiliary tanks to supply high-pressure coolant to various operations. Each tank has a 200 gallon capacity. In the block and cylinder head departments there are 69 such tanks.

The original tank design included an overflow to allow coolant to flow continuously through the vessel knowing the wet, dark environment of the tank is ideal for fungal growth. GM engineers decided to modify the design in order to eliminate pipes above floor level. An internal suction strainer was added to the tank to protect the pump from potential fungal growth.

As the equipment arrived MSPU personnel were alerted that fungus growth was observed in the high-pressure tanks from residue coolant used during the run-off phase. During machinery qualification numerous instances of downtime were recorded as a result of the internal suction strainer being plugged with fungi. In an effort to alleviate the downtime, MSPU treated all high-pressure tanks with KATHON™ 893 fungicide once per week. This practice began in early July

2000 and continued until November 2000. As the plant production increased, downtime due to high-pressure tank cleaning also increased.

INITIATIVE

When the downtime became critical and production goals were affected, GM management made the decision to evaluate Zeta Rods™ as a technology that would alleviate the problem. GM Flint purchased enough Zeta Rods™ to install one in every high-pressure tank. It was decided that MSPU would manage the process.

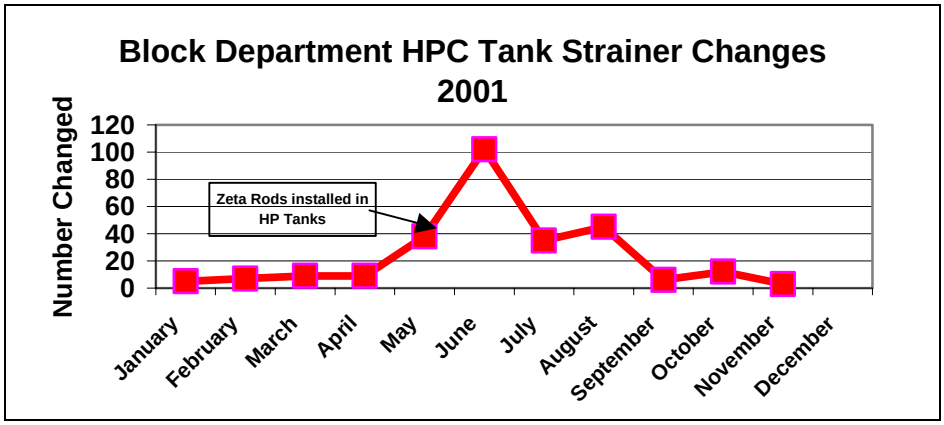
Sixty-nine Zeta Jr's were purchased and installed. The rods were installed in the block and head department's high-pressure tanks during the week of 5/21/01. There was no prior preparation of the tanks.

OUTCOME (Non-Financial Summary)

Due to the installation of Zeta Rods™ the following improvements were noted:

- Downtime due to fungus in the high pressure tanks is no longer an issue
- Removing the suction strainers in the high pressure tanks has not had a detrimental affect on machine performance
- Inlet filter changes in the coolant supply header reduced dramatically.

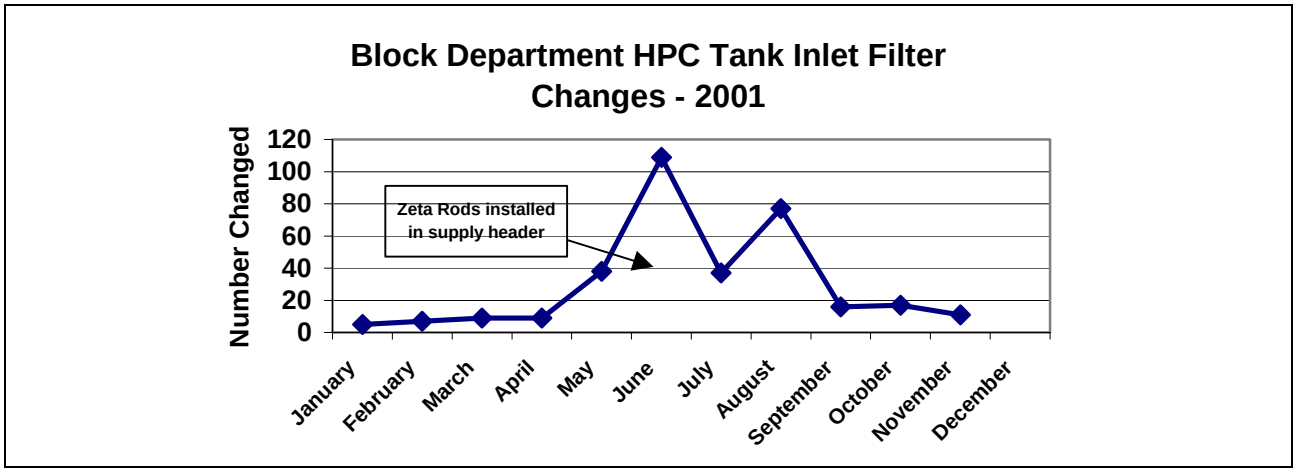
<u>High-Pressure Tank Results</u>
As the following chart indicates, after the installation of Zeta Rods™, there was some increased activity in cleaning of high-pressure tanks as the fungal material began falling off the tank walls. Two weeks after the installation a decision was made to remove the suction strainers from 90% of the high-pressure tanks because fungus was no longer growing at the top of the tanks. The instances of down time due to high-pressure tanks dropped considerably during the subsequent months.



Results of Installation in Coolant Supply Headers

Following the installation of Zeta Rods™ in the high-pressure tanks, it was decided to install additional rods in the main coolant supply header. The installation took place on June 9th & 10th 2001 and they were activated on June 11, 2001.

Documentation of incidents of inlet filter problems showed a dramatic increase during the 72 hours following installation (It should be noted that additions of fungicide were made to the system a few days prior to activation of the Zeta Rods™). The plugging of inlet filters lasted approximately a week following the installation of the Zeta Rods™ and then returned to normal. (See following chart).



Plugging of Boll & Kirsch Filters

Following the installation of the Zeta Rods™ in the coolant supply header, there was a dramatic increase in plugging of Boll & Kirsch filter elements, resulting in down time while filters were cleaned. They were totally blinded-off by dead and live fungal material suspended in the coolant. During this time a mechanical issue was discovered that did not allow the filters to go into "rapid index" mode, which may have minimized them from blinding.

The increase in the amount of suspended material can be attributed to the action of the Zeta Rods™ and fungicide treatment prior to their installation.

Lessons Learned

The most important lesson learned is that benchmarking prior to installation is absolutely necessary. A system inspection must be done to determine the degree of microbial fouling and this inspection must include all tank surfaces, including supply and return headers. If the system allows for removal of expected fungal mass "fallout" following the installation of Zeta Rods™, cleaning might not be necessary. Also, a more through understanding and planning for the "burp phase" would have minimized the downtime experienced by the customer.

FINANCIAL ANALYSIS

- Reduction in downtime due to high-pressure tanks (no dollar figures available)
- Reduction of downtime due to problems with Boll & Kirsch filters. (No dollar figures available)
- Reduction in anti-foam in block and head systems due to alteration of the surface tension of coolant. **$120,000 annually**