



# **Visit to Wire Plant by**

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# INTRODUCTION

- Metalquip decided to visit galvanizing plants in the USA where PRO-pHx Acid Life Extender is used in the acid pickle to gain first hand experience of the application and benefits.
- The first plant to be visited was a Wire Plant Accompanied by Tom Philipp, President of PRO-pHx Inc, USA.
- Hosted at Plant by Process Engineer,.
- Only allowed to view and ask questions about the pre-treatment section of the plant up to the pickle rinse.
- Will share in this presentation the main findings, conclusions and recommendations from the visit.

# TOM PHILIPP

(President PROpHx Inc, USA)



# ANNEALING

- Achieved with Water Patenting.
- Wires run through furnace maintained at 1000 °C.
- Water is then quenched in long quenching tanks.
- Quench water is cooled through cooling towers.

# DRYING

- 2m gap between quenching & entry into first pickle tank.
- Wires run over an air extract drying station with further drying due to evaporation.
- Enter the pickle tank dry.

# WIRE DRYING STATION BETWEEN QUENCH & PICKLE



# PICKLING

- Wires run through 2 x 7m HCl pickle baths, each containing 3000 litres 12% HCl.
- HCl is treated with PRO-pHx Acid Life Extender.
- All the 32% HCl additions contain 1% PRO-pHx Acid Life Extender.
- Acid is never decanted.
- Tanks are enclosed and air is extracted to a scrubber.

# PICKLE TANKS

## 2 x 3000 litres



# PICKLE EXTRACT SCRUBBER





# AIR EXTRACT AFTER PICKLE TO REDUCE DRAG OUT



# RINSING

- **Performed in a long 11 station counter flow rinse tank.**
- **Wires run through 11 vigorously agitated “fountains” of rinse water.**
- **Volume of rinse water going to the WWT plant is greatly reduced with the 11 station arrangement.**

# 11x STATION COUNTERFLOW RINSE TANK



# RINSE FOUNTAINS



# RINSE FOUNTAINS



# FILTRATION

- In the past filtration was done with filter cartridges and filter bags.
- Previous arrangement was not satisfactory due to its labour intensive nature.
- Recently, a Two Chamber Global Automatic Back Wash Filtration System was installed.
- Back washing of the chambers take place when back pressure reaches 1.38 bar (20 psi) or every 1.5 hours.
- The chambers are air purged before and after back washing to reduce acid loss and dilution.
- Filter medium is rated at 20 micron.

# TWO CHAMBER AUTOMATIC BACKWASH FILTER SET



# BACK WASH WATER

- City water is not used for back washing.
- Instead water is pumped from the first rinse station, before the rinse water goes to the WWT plant.
- Back washed sludge is discharged to the WWT plant.
- No additional volume added to the WWT plant.
- Lower acid concentration used with PRO-pHx Acid Life Extender saves on neutralization chemicals and reduces hydroxide solids.
- Additional WWT plant load caused by the back wash sludge,  $\text{Fe}_2\text{SiO}_4$ , is easily handled by the WWT plant and ends up in the filter cake with the  $\text{Fe}(\text{OH})_2$ .



# PROPOSED ARRANGEMENT FOR WIRE LINE

PRO-pHx

30% HCl HOLDING TANK with PRO-pHx (1.0%)

TO WWT PLANT

WIRE GALVANIZING PICKLE TANK

WIRE PICKLE TRAY

RINSE TANK

BACK WASH

PURGE AIR

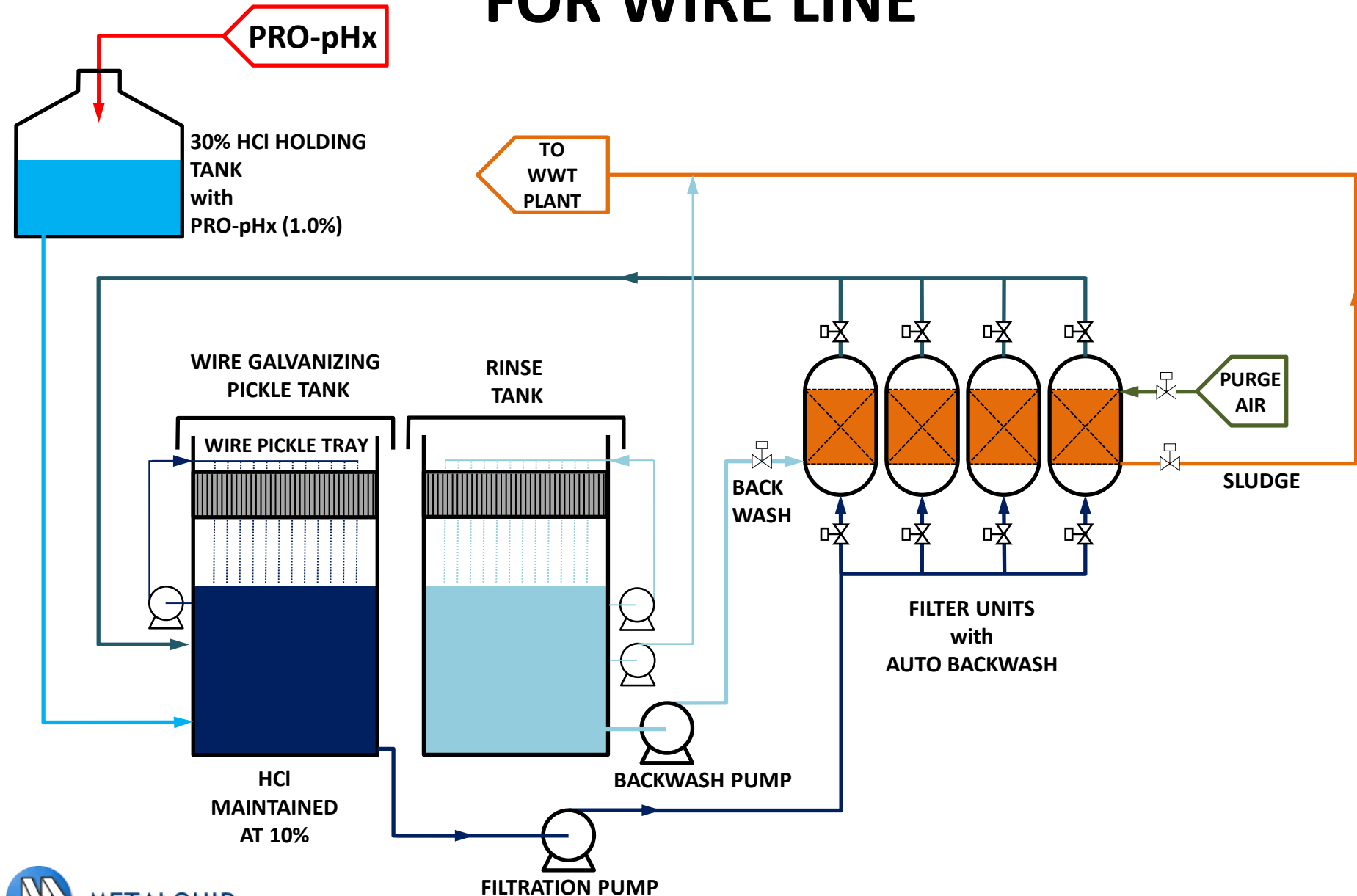
SLUDGE

FILTER UNITS with AUTO BACKWASH

BACKWASH PUMP

HCl MAINTAINED AT 10%

FILTRATION PUMP



# PLANT PRODUCTION FIGURES

## Production

- Plant processes on average 110 tons per day,  
for  $7 \times 49 = 343$  days = 37 370 tons per year.

## Acid Consumption

- 32% HCl consumption is 350kg/day, 3.18kg 32% HCl/ton.
- The equivalent is 3.42kg 30% HCl/ton, or 6.84 16% HCl/ton.
- The PRO-pHx consumption is 3 litres per day.
- For double strength PRO-pHx the consumption will be 1.5 litres per day.

## Concentration

- The Fe concentration remains stable at 80g/l.

# CONCLUSIONS

- **Changing to PRO-pHx Acid Life Extender with a Global 2X Back Wash Filtration System has:**
  - **reduced waste acid removal by 90%.**
  - **reduced virgin acid purchases by 30%.**
  - **reduced the iron and acid loads to the WWT by 75%.**
  - **reduced the iron drag in to the flux.**
  - **reduced dross formation.**
- **Customer is very satisfied with the improved pickling performance.**
- **Simplified & labour free filtration.**
- **Overall cost savings.**

**Thank you!**

**Questions?**

**PRO-pHx**  
**Acid Life Extender**

**PRO-pHx**  
**Acid Life Extender**

**available from**



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