



Ashok Leyland : A Brief History

- § 2nd Largest Commercial Vehicle Manufacturer in India and market leader in technology
- § Established in 1948
- § Six Manufacturing facilities across India and joint ventures abroad
- § Annual Turnover of Rs. 8300 Crores
- § About 12000 employees
- § All manufacturing plants in India are certified for ISO14001 & TS16949
- § Vehicles and Engines - Complying to Euro Norms
- § Launching First hybrid electric vehicle of India
- § Market leader in CNG Powered bus

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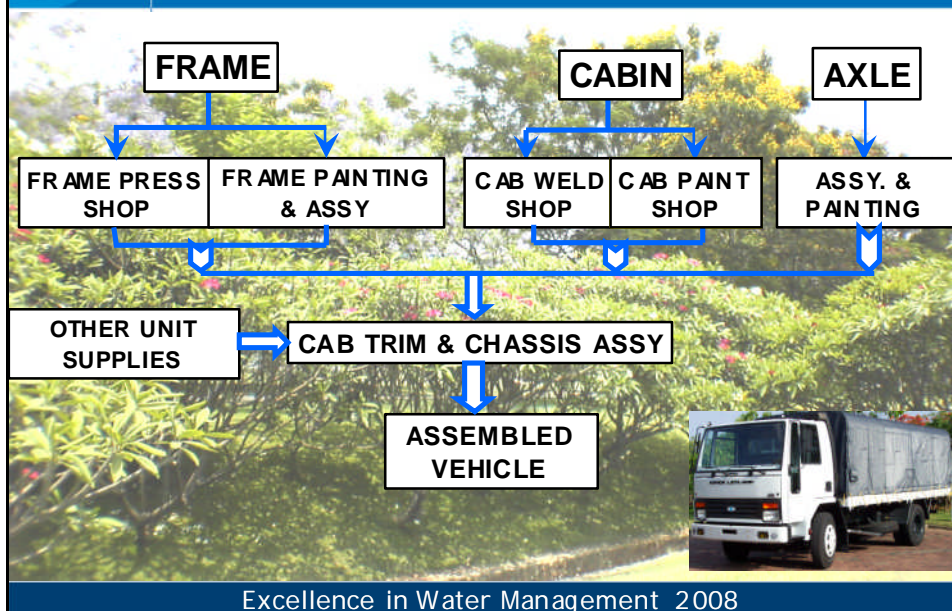
Ashok Leyland, Hosur – II

- Ø Established in 1994
- Ø Spread over 197.15 acres
- Ø Manpower – around 1250
- Ø Annual turnover of 1597 crores
- Ø TS 16949/ ISO 14001 Certified

- Greenery:
- Ø No of Trees – around 19500
 - Ø Garden Area – 1,70,000 Sq.m.
- Rain Water Harvesting:
- Ø Total storage capacity 70,000 KL/season

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Plant Block Diagram



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Comparison with Global norms / benchmark

Inefficient water use by industry

The ratio of water consumption and economic value creation in Indian industry is poor. For every cubic metre of water that Indian industry uses, it generates merely US \$7.5 economic productivity

Country	Industrial water use (billion cubic metres)	Industrial productivity (million US \$)	Industrial water productivity (US \$ / cubic metre)
Argentina	2.6	77171	30
Brazil	9.9	231442	23.4
India	15	113041	7.5
Korea, Rep.	2.6	249286	95.6
Norway	1.4	47599	35
Sweden	0.8	74703	92.2
Thailand	1.3	64800	48.9
United Kingdom	0.7	330097	443.7

Source: World Bank, 2001

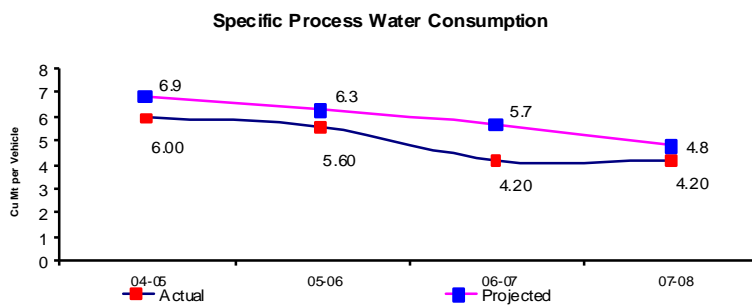
At Ashok Leyland, Unit II

Total Industrial Water : 71213 Cu Mt.
 Productivity : US \$879007
 Industrial water productivity : 12.3
 (US \$ / cubic metre)

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Specific Process Water Consumption



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Water Saving Projects

Project: I

Zero Discharge Effluent Project

Objective:

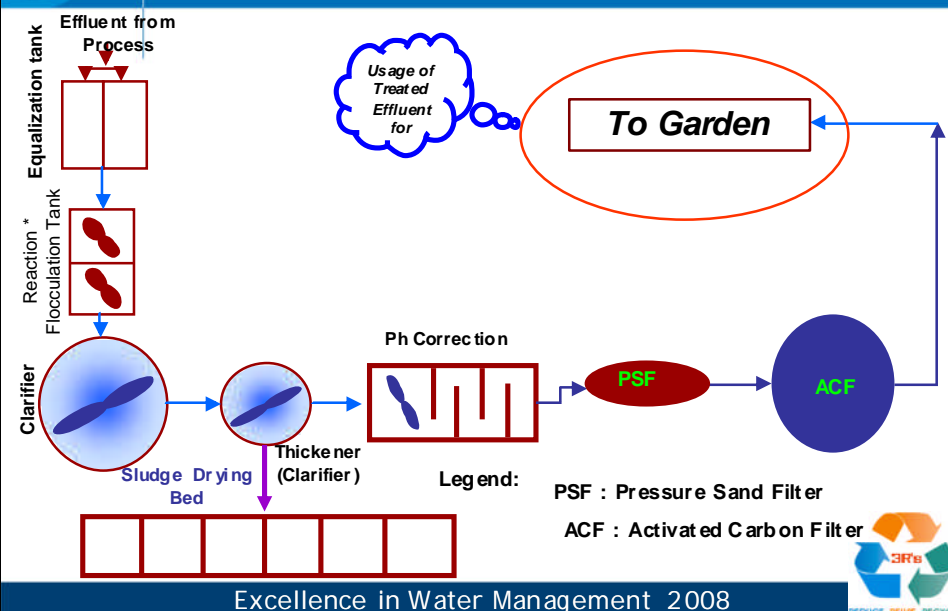
To recycle effluent (through Effluent Treatment Plant + Reverse Osmosis Plant) to use for Paint Process like:

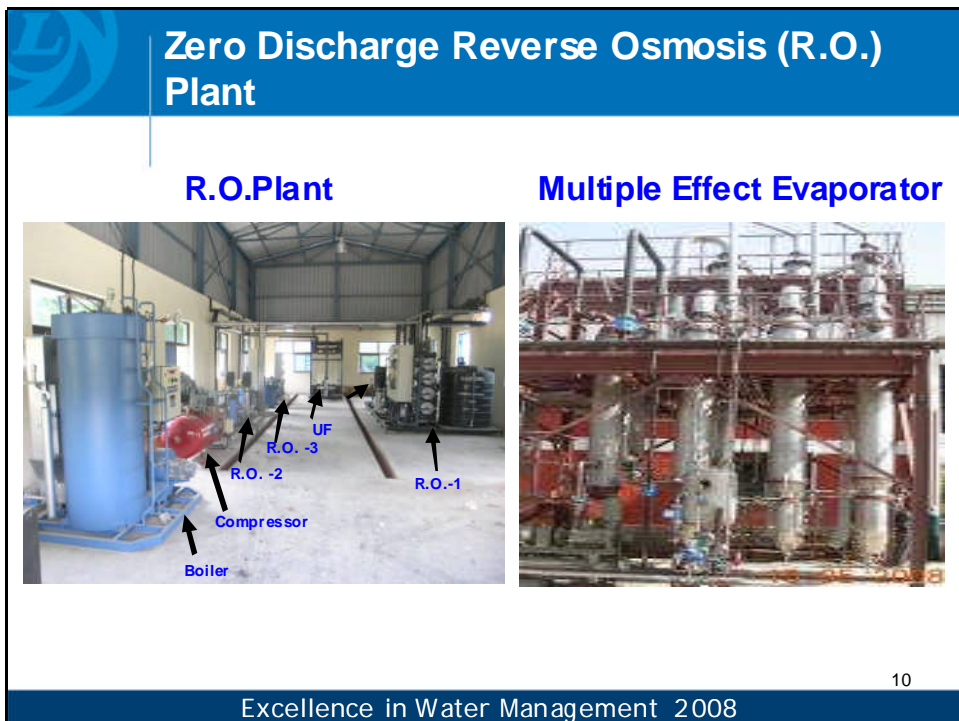
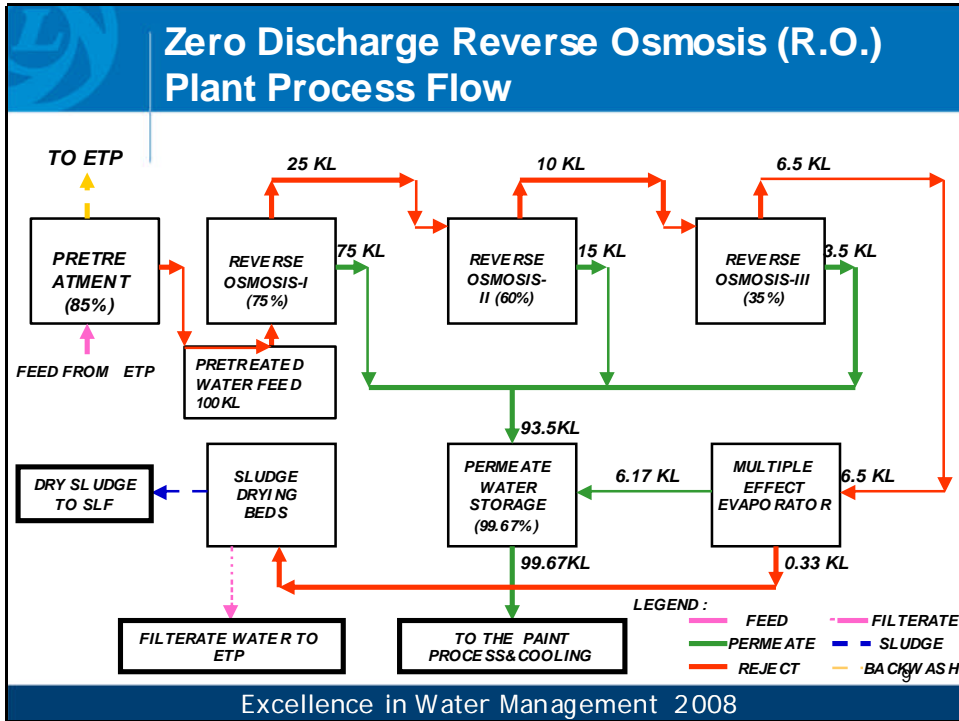
1. Rinse water in paint line.
2. Feed to hot water generator.
3. Cooling circuits in compressor house & weld shop.



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Before Zero Discharge Project: Process Flow of Industrial Effluent





Quality of Effluents

Sl. No	Parameter	TNPCB Tolerance limit	After Treatment Through ETP	After Treatment Through R.O.
1	pH	5.5 – 9.0	6.5 – 8.5	7.0
2	TSS (mg/l)	100	< 10	<1.0
3	TDS	2100	< 1000	52.0
4	BOD	30	< 15	<1.0
5	COD	250	< 100	<1.0
6	Copper (as Co) mg/l	3	< 1.0	<0.05
7	Zinc (mg/l)	1	< 0.5	<0.01
8	Chlorides (as Cl) mg/l	1000	< 500	13.0
9	Oil & Grease	10	< 3	<1.0
10	Sulphates (as SO ₄) mg/l	1000	< 500	<0.2
11	Dissolved phosphate mg/l	5	< 3	<0.05

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Investment in Zero Discharge Project

PARTICULARS	COST IN RS. LAKHS
RO PLANT	85
MECHANICAL EVAPORATOR	98
CIVIL CONSTRUCTIONS	48
STEAM BOILER	8
PIPING WORK	13
ELECTRICAL WORK	23
TOTAL COST OF PROJECT	275

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Benefits of the Zero Discharge Project

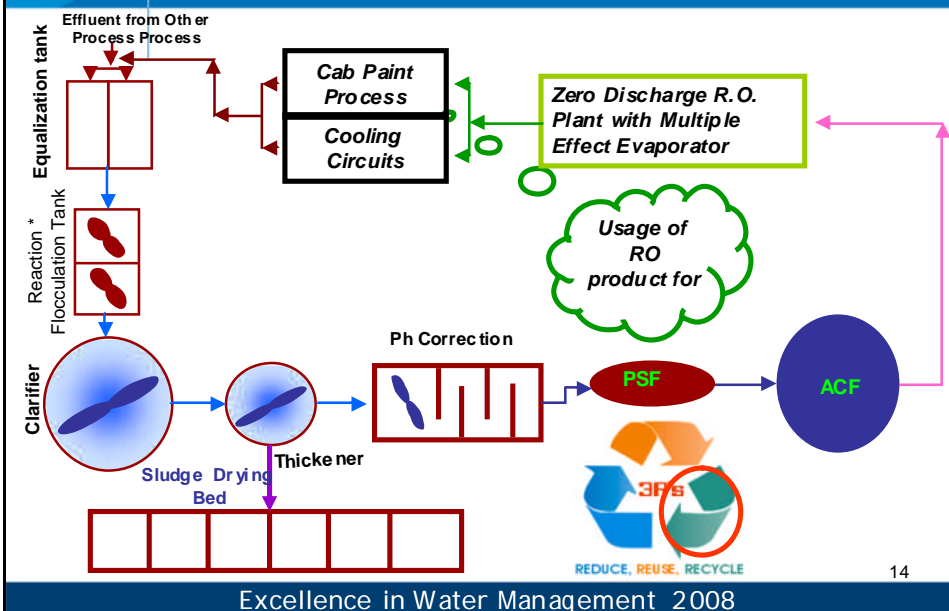
The occurred savings :Rs. 12.6 lakhs/annum.

- ∅ The entire treated water is being used for the plant paint process and cooling circuits(100 kl/day present volume).
 - **Rinse water in paint line.**
 - **Feed to hot water generator.**
 - **Cooling circuits in compressor house & weld shop.**
- ∅ Being 3 stage R.O. Plant, the membrane recovery achieved is 90-94%.
- ∅ Lesser the reject quantity the operation of Multiple Effect Evaporator (Triple Effect) evaporator is less.



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After Zero Discharge Project: Process Flow of Industrial Effluent



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Project - II

Project description

To reduce soft water consumption in Paint process

Objective:

To reuse pre treatment Rinse-I water to Rinse-II there by reduce the soft water consumption in paint process.

Target :

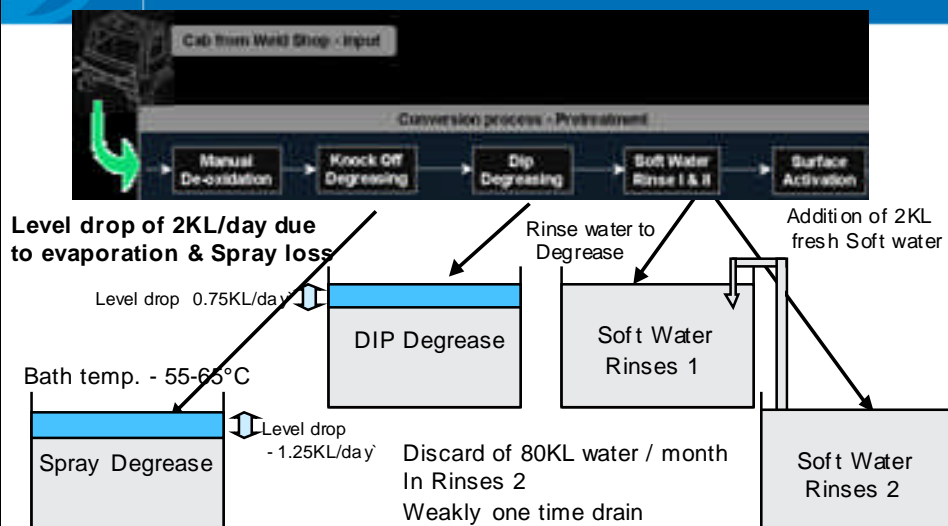
To reduce soft water consumption by 5% / day in pretreatment line.



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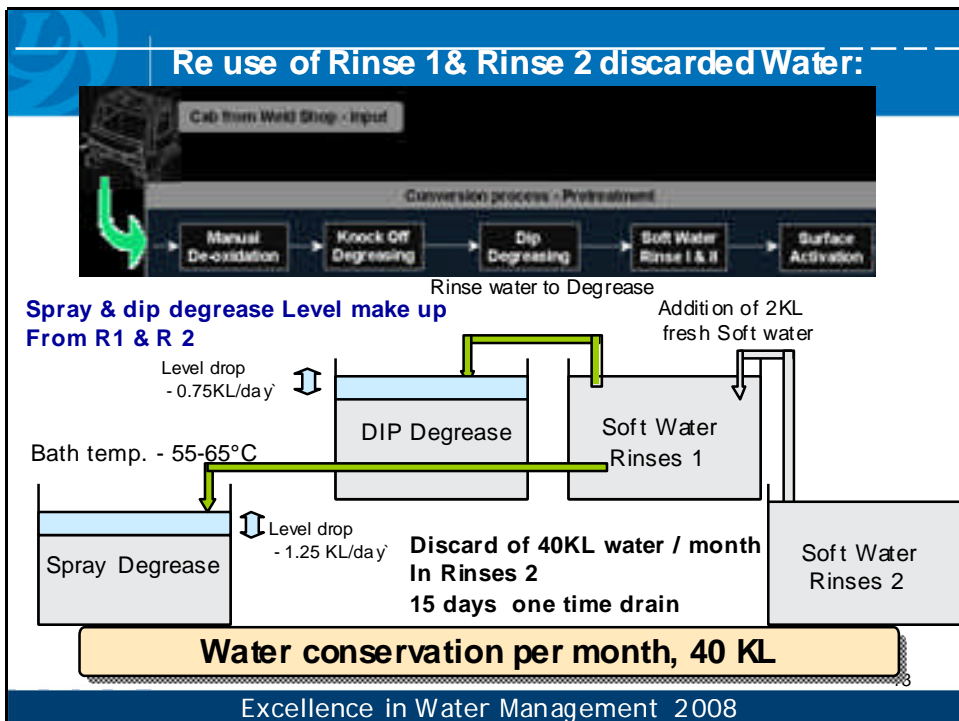
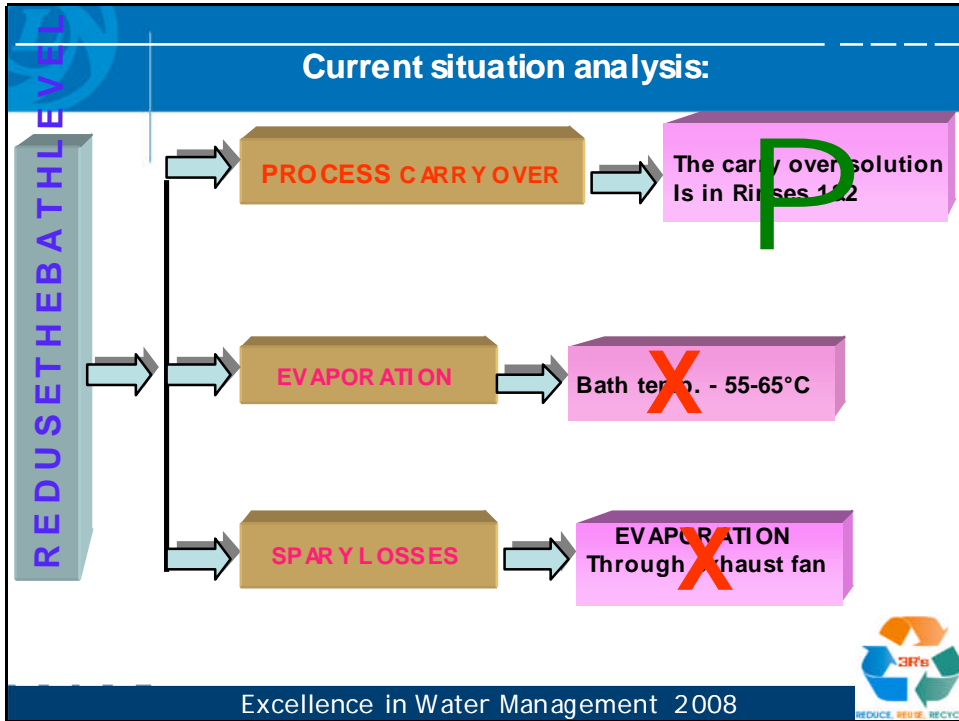
Problem identification :

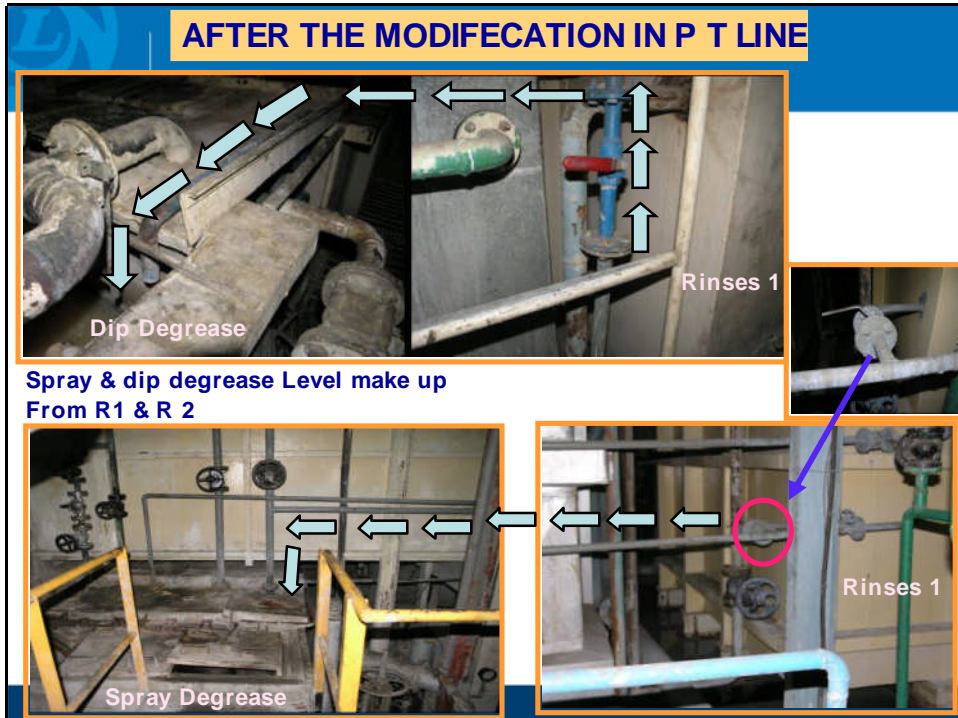
HIGHER SOFTWATER USAGE IN PT LINE



WHY REDUCE THE BATH LEVEL IN PT TANK ?

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Benefit to Environment

- **Soft water saving of 480 KL/annum by reusing Rinse water**
- **Soft water Plant regeneration reduction by appx. 2 times/annum**
- **Reduction in regenerating chemicals by 400kg i.e.Rs.1800 / annum**

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Tangible Benefits:

Process Tank	Before Project	After Project
Rinse 2 draining frequency	7 days once	15 days once
Rinse 2 water requirement/month	80 KL	40 KL

Cost Saving

Source	Quantity,/annum	Rs./annum
Water	480 KL	Rs. 24000

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Tangible Benefits:

Water conservation per annum: 480 KL i.e. Rs. 24000

Reduction in Effluent generation: 3080 KL i.e. Rs. 27104

Intangible Benefits:

1. Improving Environment by Conserving Resources & Reducing Effluent to ETP

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Project - III

Project description

Elimination of water softener usage.

Objective:

Reduction of Effluent generation by eliminating softener usage.

Target :

To reduce effluent generation by 4380 KL / annum



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Feasibility study

Soft water usage

Soft water is being used for our

1. Paint process
2. Hot water Generators,
3. Cooling circuits in Compressors
Chiller Plants, weld guns



Daily requirement of soft water is 75 KL.

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Feasibility study

Quality of soft water required

SI No	Application	water Hardness in ppm	Remarks
1	Paint pre treatment process rinsing	< 5	Sensitive to quality
2	Cooling circuits in Compressor, weld guns,	< 5	Sensitive to scale
3	For hot water generators in paint shop	< 5	Sensitive to scale

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Feasibility study

Quality of R.O.water available

SI No	Critical Parameters	water quality in ppm	Conclusion
1	pH	7	R.O. water quality is superior than soft water.
2	TDS	52	
3	Hardness	< 2	

Action taken

- Taken approval from Paint process team
- Laid pipeline for inter connecting R.O.treated water piping and soft water storage sump .

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Results - BENIFITS FROM THIS PROJECT

Effluent reduction by eliminating softener per day

- The daily rinsing +regeneration water: 12 KL

Net water saving / annum is =4380 KL

Tangible benefits per annum:

- The softener regeneration
Chemical cost / annum Rs. 46800/-
- The water cost : Rs. 13,140/-
- Cost of avoidance at ETP+R.O. : Rs. **672768/-**

Total cost saving/ annum in Rs- 732708/-

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Project - IV

Project :

New Liquid surface conditioner PL-X

Objective :

Water Conservation through alternative surface activation chemical

Present status :

Water consumption in surface activation process presently 3,120 m³/year

Target :

To reduce the water consumption to 620m³/year, resulting in net saving of 2,500m³/year

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Aging duration: Solid vs Liquid Surface Conditioner

✓ Solid Surface Conditioner

Chemical	Nipafin ZS
Type	Solid
Draining freq.	Weekly
Water used	60 KL

Aging Duration, days

0		14

✓ Liquid Surface Conditioner

Chemical	PL - X
Type	Liquid
Draining freq.	Monthly
Water used	60 KL

Aging Duration, days

0	14	28

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Conventional Surface Conditioner Bath

Helps to achieve low temperature and high paint performance phosphate System.

The stability of the Ti colloid is poor & it requires draining & replenishment of bath

Phosphate Crystal Structure

With SC	Without SC

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Comparison of Solid & liquid Surface Conditioner

PL ZS	PL X
Solid type	Liquid type
Shorter bath life	Longer bath life
Good Phosphate coating	Superior phosphate coating
Fine Crystal morphology	Finer crystal morphology
Longer phos process time	Shorter phos process time
Auto drain required	Auto drain not required
Hash marks can be seen	Hash marks cannot be seen
Poor phosphatibility on hard to react steel	Good phosphatibility on hard to react steel

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Results and Standardization

Water saved through the project (Raw + DMW): 2706 KL

Waste water reduction through the project: 2706 KL

Sludge content reduction: Approx. 1125 kg per annum

DM water consumption @ Rs. 150 / KL Rs. 3,60,000 per annum

Water consumption @ Rs. 20 / KL Rs. 6120 per annum

Waste water treatment @ Rs. 7 / KL Rs. 18,942 per annum

Energy savings @ Rs. 3.67 / unit Rs. 14,006 per annum

Chemical consumption @ Rs. 69 / kg Rs. 10,31,700 per annum

Potential savings per annum, Rs. 3.89 lakhs

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Thanking you



REDUCE, REUSE, RECYCLE
EXHIBITION

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