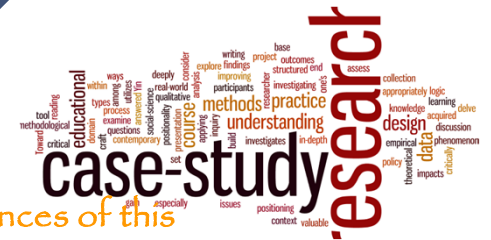




# Reorganization of Beaming in Ecological Perspective





## BIDOSB Regional View





## Problems as the time passes by

- The biggest problem
  - ▷ changing regime
  - ▷ differing the pollution load of the effluent.
- Due to full capacity running of the several biggest tanneries which processes raw hides to wet-blue, the increasing flow rates and changing the effluent characteristics gave rise to decrease the efficiency of infrastructure and regional facilities
- and also required to take measures for adequate and efficient treatment.





## Top priorities

### Reorganization model

- Capacity enhancement
- Waste management (minimization) from the source





## Capacity enhancement

### Currently

CETP has a treatment capacity of 8000 m<sup>3</sup> effluent daily and recently a flow rate of 5000-5500 m<sup>3</sup> is being processed which is coming from 3 different channels, namely; **sulphide, chromium and household effluents.**

Entree unit is simply a start-up station with coarse (13 mm) and fine screens (1 mm) and grease and sand scrapers.

### Problem;

-Recently; 50 % of the total production capacity is the ones from raw material to wet-blue stage discharging huge amount of sulphide effluents

- And also only one third of sulphide effluent could be taken into the equalization tank.

1/3 is our dilution ratio in equalization.



## Capacity enhancement (in the entire unit)

Against to the increasing flow rate;

- Unit was constructed according to the first prospects. But; now a displacement between sulphide channel and household effluents is being seen as one option. It increases the daily capacity up to 12.000 m<sup>3</sup>.

For the highly polluted waste water (with a higher TSS)

- Due to higher dispersable ingredients, the increased efficiency was needed for the station involved in coarser screens (13 mm) and especially finer (1 mm). The finer one is being choked up with the solids and used high amount of water for cleaning the screen.
- The finer screen will be replaced by the new one with higher efficiency.



Additional water increases the effluent volume.





## CETP







## Waste Management

There is only two options to do the best efficient treatment

- ▀ Decrement of total sulphide effluent volume
- ▀ Enhancement of the effluent characteristics





## Waste management

As a natural consequence of the leather processing, liquid, solid and gaseous wastes are also discharged into the environment. Among the various phases of the tanning processes, the beamhouse represents 83% of the BOD<sub>5</sub>, 73% of the COD, 60% of the suspended solids, 68% of the salinity and overall 76% of the total polluting charge are produced.

Besides, in the beamhouse, the traditional unhairing process with sodium sulfide and lime is responsible for both the highest pollution load and the effluent volume.

Consequently, the development of an alternative unhairing process, characterized by a lower environmental impact is **considered to have a high priority in the leather technology.**





## Methodology What we have done;

Our work was to suggest a set of recommendations to go along with the practitioners in promoting environmental friendly procedures.



We focused on beamhouse processes and traced back to the process parameters over the analyses.

A process recipe was set by some preliminary trials and after some modifications it was incorporated into a guideline for any private company to use their own chemicals.

Studies were performed in the factories which are active in Bursa Leather Park.



## What we have done;



After conventional and new designed processes, electrical conductivity (EC), total suspended solids (TSS), total dissolved solids (TDS), chemical oxygen demand (COD), oil & grease and total kjeldahl nitrogen (TKN) were analysed in the wastewaters.

Moreover, total sulphide and total chromium analyses were carried out in the equalization tank.

In our process guideline the variables and their effects are given in the next table



## What we have done;



Variables	Limitations (%)	Impacts	Cautions
<b>Water</b>	70-150	Continuous phase in dispersion, appropriate mechanical action	Volume of pollution load, wrinkles along with increasing mechanical action
<b>Liming Auxiliaries</b>	0.5-2	Good dispersion of primary lime and other particles	Good and appropriate swelling, clean-up of soluble materials and epidermal deposits
<b>Reductive surfactants</b>	0.3-1	Improves loosening of epidermis, scud and the removal of natural pigment.	Allows a significant reduction of the sulfide and reduces pollution and alkalinity
<b>Keratinase</b>	0.2-1.2	Degradation of soft keratin and loosening of hair root	low COD, less sludge, reduced nitrogen
<b>Sodium hydrosulphide</b>	0.5-1.2	Milder effect on break-down of disulfide bonds (S-S) of cystine causing keratin degradation	Increases the pH, alkalinity. Total destruction of keratin and thereby; increased sulphide and soluble colloids in effluent
<b>Sodium sulphide</b>	0.5-1.0	Stronger break-down of disulfide bonds (S-S) of cystine causing keratin degradation	Increases the pH, alkalinity with high swelling and veininess. increased sulphide and soluble colloids in effluent
<b>Calcium hydroxide</b>	1.6-2.8	Opening-up and collagen hydrolysis	Relaxed leathers with loosened grain, necks' and shanks' wrinkles. Collagen fibers become finer and shorter, which allows obtaining emptier leathers.



What we have done;





## Results and Discussions

What we have obtained;



The results can be summarized as below;

- Quality enhancement in limed pelts and splits
- Beneficials in waste water quality and CETP practices





## What we have obtained;

### Quality enhancement in limed pelts and splits



- Increasing yield in split practicing (with 50-55 % as per the thickness of 2.6-2.8 mm splitting)
- Efficiency and performance in splitting and also well handling,
- Valorization of splits in gelatine production as a very good quality raw materials, increasing the productivity in gelatine production (yield approx. 17% in gelatine production),
- Increment of 2-3% in a real area yield totally,
- A remarkable improvement in mechanical properties of leather, especially in tear strength,
- Possibility of variations in appropriate wet-end processes for multi-purpose and universal finished leather in many end usages.



## What we have obtained;

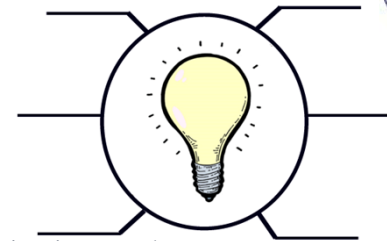
### Beneficials in waste water quality and CETP Practices

- ~ Decrement of water usage up to 65% for both soaking and liming,
- ~ Better end-of-pipe waste water quality involved in some parameters of COD, TSS, TKN, Salinity, Conductivity, Total Chromium, Chloride, Sulphide, pH and alkalinity etc.,
- ~ Rehabilitation in efficient CETP practices, sustainable and productive model of controlled management in treatment for local and internationally adopted legislations,
- ~ Improvement of opportunities in use for established capacity involved in tanks, pits, pipes, channels and pumps etc.,
- ~ Decrement of maintenance costs in CETP and its infrastructures,
- ~ Better management in biological unit of treatment (optimal bacterial growth in lower nitrogen and salinity etc.),
- ~ Lower sludge formation and improved sludge quality for disposal,
- ~ Minimization of pollution load of wasted oils and grease for CETP and its infrastructure





## Conclusion



The final and highlighted agenda in leather production globally is the process pollution which needs to be overcome by adopting sustainable cleaner technologies and shifting a new model of management.

Bursa case is an example for this new model which is over control and management.

In this case study; we are working on a regional model involved in reorganization in which renovations in CETP and waste management in the source are involved.

For the management the mostly proven and best available techniques were carried on and adoption of the novelties depends on the enhancement of CETP efficiency.

Our study provided the total betterment in effluents with reduced pollution load by designing an eco-friendly process guideline and thereby; efficient treatment possibly achieved.

Finally; we are moving in the path of new and more efficient approaches as per the perspective at the forefront.



## Acknowledgement

Bursa Leather Park is highly appreciated for its leading in the challenges of the technological evolutions



Many thanks for your attendance  
and contribution to ALLP I  
Forum

