Johannes Sordi

Factory improvments in pipe-plants

I. Situation

Pipe Plants are in need of permanent Improvements at all Pipe-Production-Processes, enabling continuous optimized operation and output .This allow the pipe companies to stay competitive as well as meet changing market demand.

But in reality Plants initiate “Improvements” only gradually in replacement of specific production machinery, characterized as “partial improvements” or “re-investment” or “replacement” of aged, defect machinery, only.

Most Pipe plants don’t follow permanent Improvement Programs, covering a whole Plant, or even lacking Department or People who beside day-to-day operation systematically compare Actual Process Achievements against State of Art Technologies and recommend changes to increase Productivity.

II. PIPE-PLANT IMPROVEMENT CONSULTANCY

Especially pipe companies which do not have own dedicated improvement teams may benefit by seeking consultancy to assess and utilize potentials of their mills. This will grant them access and knowledge to latest technologies and production know how of state of the art process employed today in plants worldwide. A consultant could also assist companies with new investment or modernization teams in defining and implementing continuous mill improvements plans.

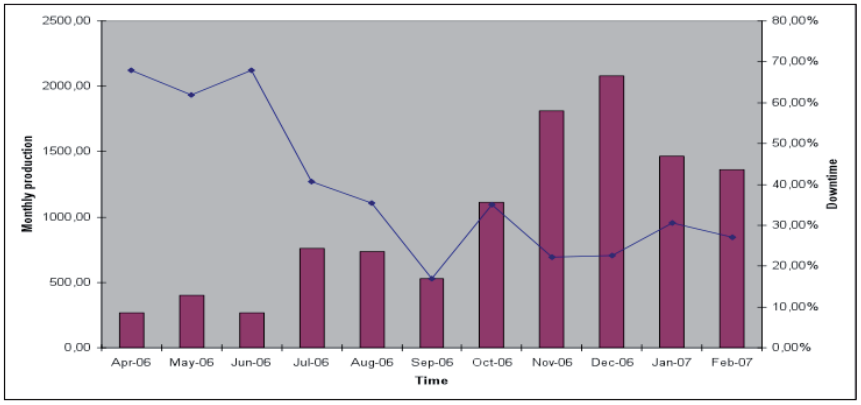
Increasing Out-put-rates, Idle Time Reduction, Cost Savings in Welding Consumables, Spare & Wear Parts, Shop floor management-training in welding and QC including welding Defect Training, Procurement and Production Planning and implementation of Pipe-Plant Incentive Programs are a round-up of the available Consultant Spectrum.

III. IMPROVEMENTS-PROJECT-RESULTS

Below are some typical Improvements from various Pipe Plants:

1. A reduction of Idle-Times (≈ 40 %) resulting in Out-Put Rate increase of + 400 pipe/Month

   1. IRAN

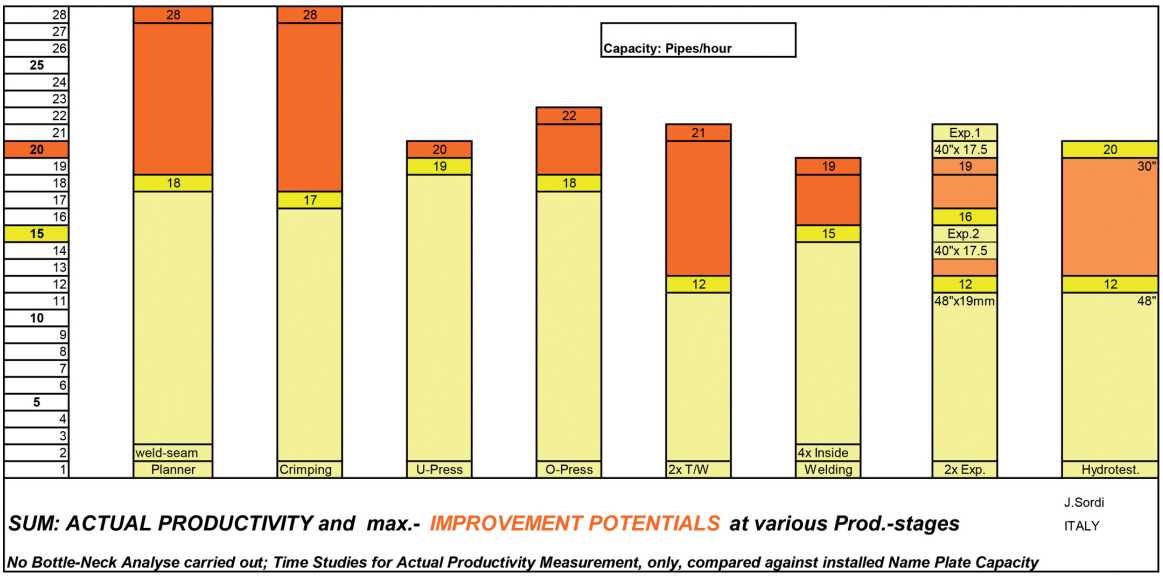


ACTIONS TAKEN to ACHIEVE the TASKS: ACTIVE DAILY MANGEMENT to reduce Idle Times in Production & QC, i.e., by stringent Plate/Pipe acceptance, effective usage of Production-hours; Welding- Process review, Training Welder & QC, Change to reliable communication/ reporting at all Departments.

2. ITALY

Fact-Finding (listing of all possible Improvements) showed that this plant, from mid-60-ties, was under-performing at nearly all production steps.

2.1 Time Studies confirmed that underperforming of the Pipe Plant varied between 50 % - 100 % of Name Plate Capacity guaranteed by the Supplier. The diagram below shows the actual Productivity (yellow) compared to the 100 % possible Name Plate capacity (brown).

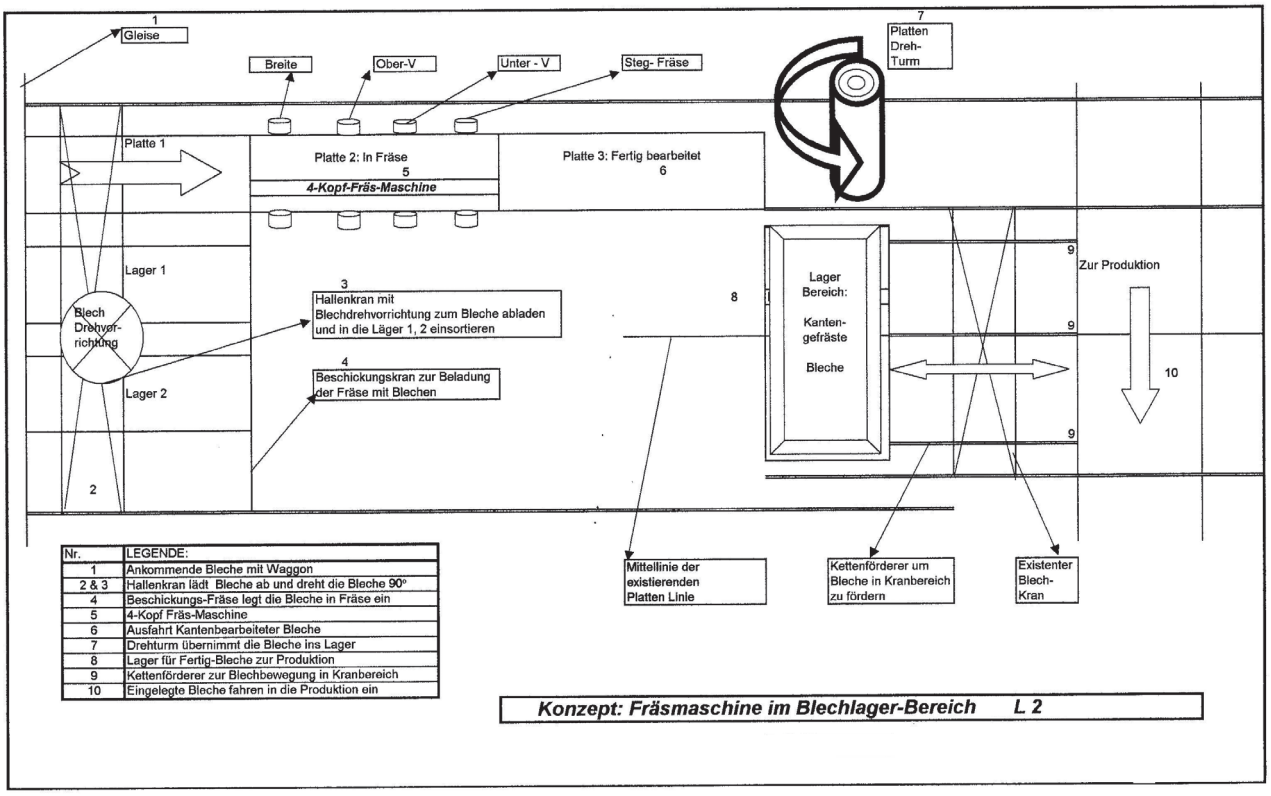


ACTION TAKEN: I. Time Studies

- Production Machines
- Pipe Transport-Systems

Analyze time-saving potentials of the two areas and prioritize Improvements based on direct Machinery related Productivity-Improvements. Another Time Study sequence was executed to evaluate all Pipe-Transport Areas at the whole Pipe Production, as a comparable measure to differentiate Cycle Times in Production & Transport related Times, to receive an orientation to Prioritize further Implementation arrangements.

II. Design-Recommendation for improved Plate Storage & Transport, as shown next for Plate-Storage extensions, High-Speed-Milling Machine Integration



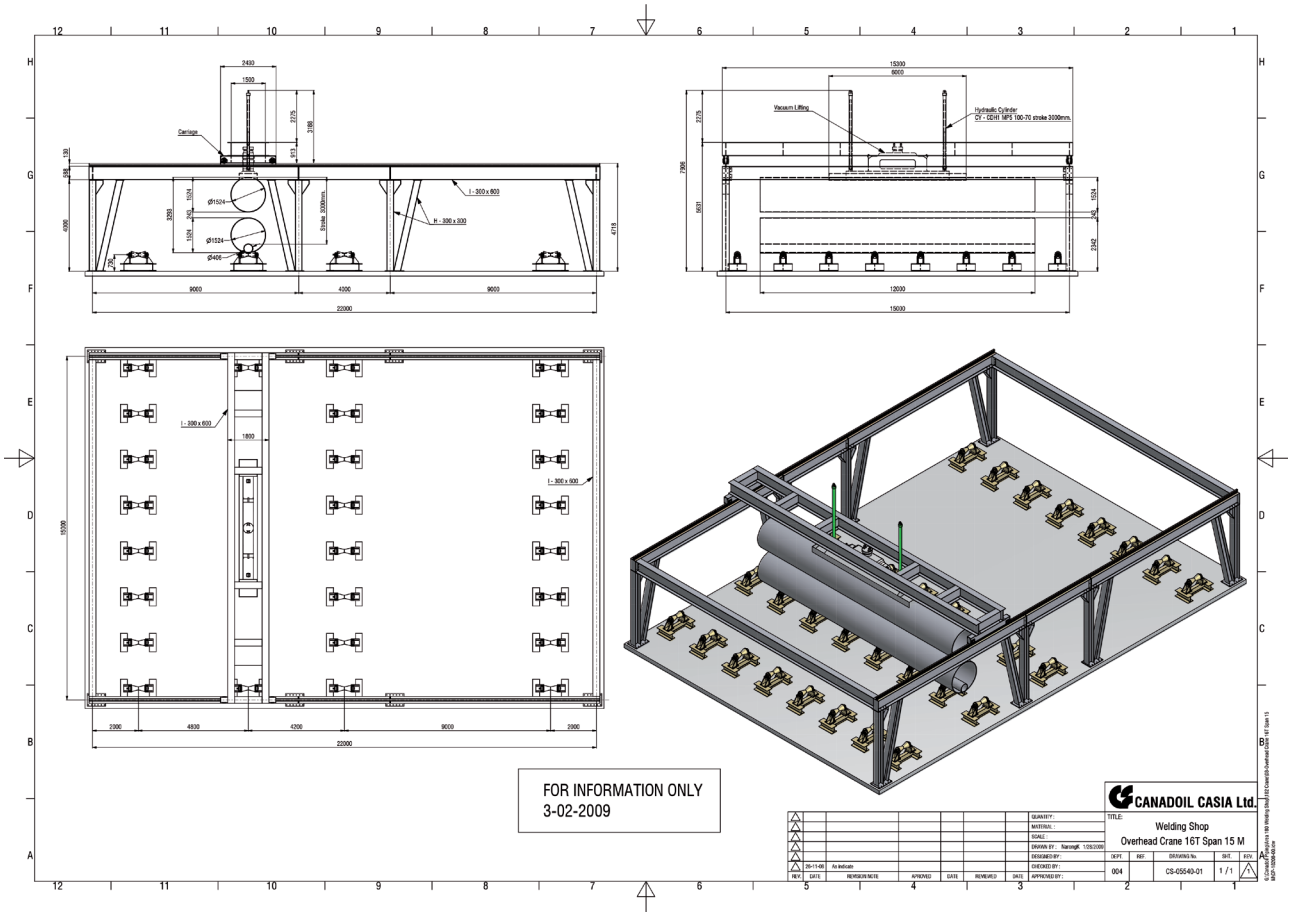
The finally recommended Lay-out has other Advantages worth to mention:

- Milling Machine follows Plate waviness and achieve a uninterrupted, constant weld-seam profile, resulting in much less welding defects (lower Repair-Rate); Average Pipe-Length increase significantly, lower numbers of Idle-Times and reduction of Idle Times between Diameter & Dimension changes in Production, since the Plate Storages are used as Storage of prepared Plates to compensate Tool changes at milling machine, last Plate of a final job, first plates of new job.
- Extended Plate Storage Areas and more uninterrupted Plate-Flow into main Production-Line.

3. THAILAND

This Plant was integrated in to 3 incoherent Factory-buildings, consequently a high number of Transport-Times added-up to 40% of the total Production-Time. Needless to say that Idle-Time are high, Out-Put-Rates are very low (Deliveries are always too late).

The Drawing below shows a Design-Idea how to improve Out-Put-Rates at two Outside- Welding-Machines. Essentially the Roller conveyor beside the Welding line has to be added-on and a Steel-Structure to take a new Pipe into welding area while final welded pipe moves out (secondary timely transport-operation parallel to main operation time = No waiting Time), a new pipe (overhead transported) vertically moves-down into the welding area.



An extraction from Time Studies shows that such Design Change increases Productivity by +25,63 %, from actual 4,8 Pipes/hour at each of 2 Outside Welding Machines, to 6,03 Pipes/hour/ Outside welding machine

Time & Motion Analyze at Outside Machine

36" x15.9 mm SMID

TIME-ANALYZE based on 15.9 mm	Actual (min.)		Time-Savings:
1. Welding Finished	0:00:00		
2. Carrier moves Pipe out*	0:01:15		0:35
3. Carrier moves to Loading Point	0:01:24		1:24
4. Pipe Loading	0:00:34		0:34
5. Carrier move to welding Point*	0:00:18	TOTAL:	2:33
6. Turn pipe, Preparation for welding Start	0:01:59		
TOTAL:	0:05:30	(5:30 - 2:33)	2:57
Welding Time:	0:07:00		7:00
Cycle Time per Pipe:	***0:12:30***	***New Cycle-T.***	***9:57***

RESULTS:	***Productivity (P/h/O-W):***	***4.8***	***100%***		***6.03***	+ 25,63%
	Planned Productivity:	***3.8***	***80%***		***4.82***	+26,95%

J. Sordi 5/1/2009

**** The Measured Times under No's 2 & 5 don't include the improvement of increased speed by using variable speed motor at the Pipe-carriers.***

RESULT:

1. Yearly Out-Put increases at 80 % planned productivity to: 4, 82 Pipes – 3, 8 Pipes = 1, 02 x 2 x 20h/day x250 Days/Y = **10.200 more Pipes/Year**
2. Amortization-Time for Design: 6,5 Months
3. Design & Commissioning 6 Months

IV. How is Factory Improvement executed?
It happens in 3 Phases:

MODUL 1: FACT FINDING

FACT-FINDING: often called WEAK-POINT-ANALYZE, is based & executed as a Factory- Analyze, according to given Management Improvement-Topic's and can include/but not limited to:

- Machinery & Equipment (Idle-Time Analyze, Efficiency in Out-Put and Maintenance-Cost
- Base-material and Consumables
- Quality
- Down Time Analyze (overall Idle-Time of whole Factory
- Spare & Wear Parts (Cost-Efficiency-Ratio)
- Staff's Education & Training (Requirements & Up-dates for Production, QC & Maintenance)

MODUL 2: CATALOG of MEASURES (CoM)

The CoM is divided into 3 Categories:

Factory Improvements "without" Investment-Costs (Improvements comes out of existing Processes/Machinery/Equipment's)

Factory Improvements with "moderate" Investment-Costs (relatively low Investments)

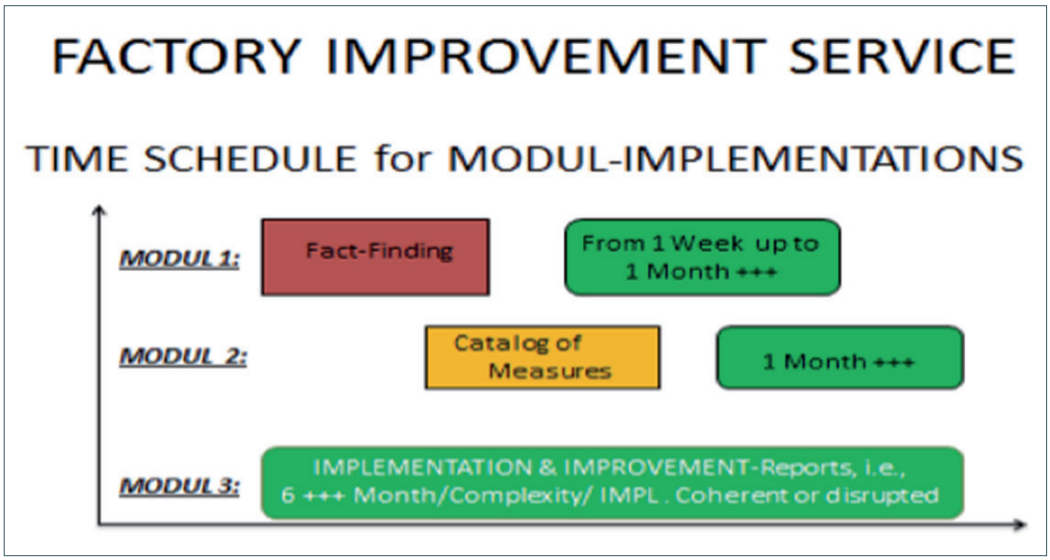
Factory Improvements with "high" Investment-Costs (New Machinery/ Technology)

MODUL 3: IMPLEMENTATION & TIME SCHEDULE

In M3 will be an IMPLEMENTATION-STRATEGY of different Measures and it's TIME SCHEDULE have to be organized.

Due to sometimes high Complexity, Implementation can't be coherent and, i.e., if Delivery Times of new Machine or Equipment takes too long. For such Period's Implementation are often sporadically interrupted; Interruption also occur if new commissioned Machinery doesn't comply to Performance-Tests, Improvement- Reporting can't be continued and live-up later, if a re-scheduled Performance Test takes place.

Example of a Factory Improvement Time Schedule



Factory Improvement is an individual tailored Service where Company Manager and Consultant have to agree to key aspects of Factory Improvements.

All shown examples are based on Companies set-up Priorities. Time Schedule varies very much due to Production-Process Complexity and Implementation-work and if Consultants are full or part-time involved.

V. IS FACTORY IMPROVEMENT WORTH THE MONEY to spend for CONSULTANT WORK ?

1. Yes, all Benefits Companies earned from implemented Improvement Projects are by fare much higher than paid Fee's for Consultant Services.
2. In some cases where new Technology is expected to be installed some Pipe-Plants want to have an independent (3rd Party)-Evaluation before Purchase Orders are placed. In such cases the Consultant, as an independent 3rd-Party, between Seller & Buyer, has to deliver a Cost-Benefit-Analyze determine that such Investments are feasible.
3. In all Factory Improvement Projects a hired Consultant has only one job – find Improvement Potentials - nothing else. She/he as an independent Institution isn't involved in any Company-Politics, favoritism of Supplier and/or Technologies. Its Integrity will be easily damaged for life-time if she/he can't stay "Neutral".

Johannes Sordi
898/2 Baan Suan LA SALLE CONDO
Sukhumvit Rd 105
Bangna Bangna
BANGKOK 10260
THAILAND
Tel.: +66 2 758 7938
Cell: +66 (0) 81 847 9837
jobkk@cscoms.com