Closed Coke Slurry System (CCS System) Int. Patents pending

In Co-Operation with
Ruhrpumpen: Sales & EPC-Partner
TRIPLAN: Technology & Engineering Provider

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Convert Your Coke Handling Problem Area

Into a

Smooth
Clean
Safe
Reliable
Effective
Automated
Consistant

Operation

By using the innovative

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Today's typical Scenario for Coke Handling….

- Cutting into Pit/ Pad
- In-situ Dewatering
- Coke Removal via Bridge Crane and/ or Front loader
- Coke Downsizing with offsite Crusher
- Transport of sellable coke to Railcars/ Silos
- Manual sludge disposal/ insufficient water management
- Economical locked-in situation, coke removal restricts cycle time

Typical Problems with Coke Handling

- Poor Reliability of Mechanical Equipment
- Absorbs Manpower
- Steam Plum widely dispersed and highly visible
- Steam Plum contains Coke fines/ Aerosols/ HC's
- Workers exposure to Steam Plum/ Safety issue
- Generally dirty Operation/ Dust emissions
- Insufficient coke fines removal & sludge handling/ poor cutting water quality
- Increasing concerns by Local Authorities/ Environmental Agencies

Today's typical Scenario for Coke Handling….

Objectives to overcome these disadvantages…

- Eliminate untypical equipment e.g. Bridge Cranes/Front loader for refiners
- Raise operators acceptance level
- Develop fully automated/ remote controllable operation for all steps
- Improve efficiency/ Gain robust Cycle Time reduction
- Improve reliability/ Reduce maintenance cost
- Minimize manpower cost
- Contain/ suppress steam from grade
- Create safe & healthy workplace
- Allow retrofitting
- Disperse authorities concerns

Task accomplished…

Solution: Convert all coke handling steps into another process unit operation refining personnel is familiar with

→ **Closed Coke Slurry (CCS) System** Int. Patents pending

- **All streams are treated as a 'liquid' → Pumping or gravity flow**
- **Crushing In-line → creates a pumpable Slurry stream**
- **Fully controllable & automatic operation -> state-of-the-art technique; DCS architecture**
- **Sludge disposal → intelligent disguised within coke slurry operation**
- **Workers exposure minimized → closed piping system**
- **Reliability improved → Latest state-of-the-art materials and metallurgy**
- **System consistency → match with state-of-the-art cutting equipment capacity**

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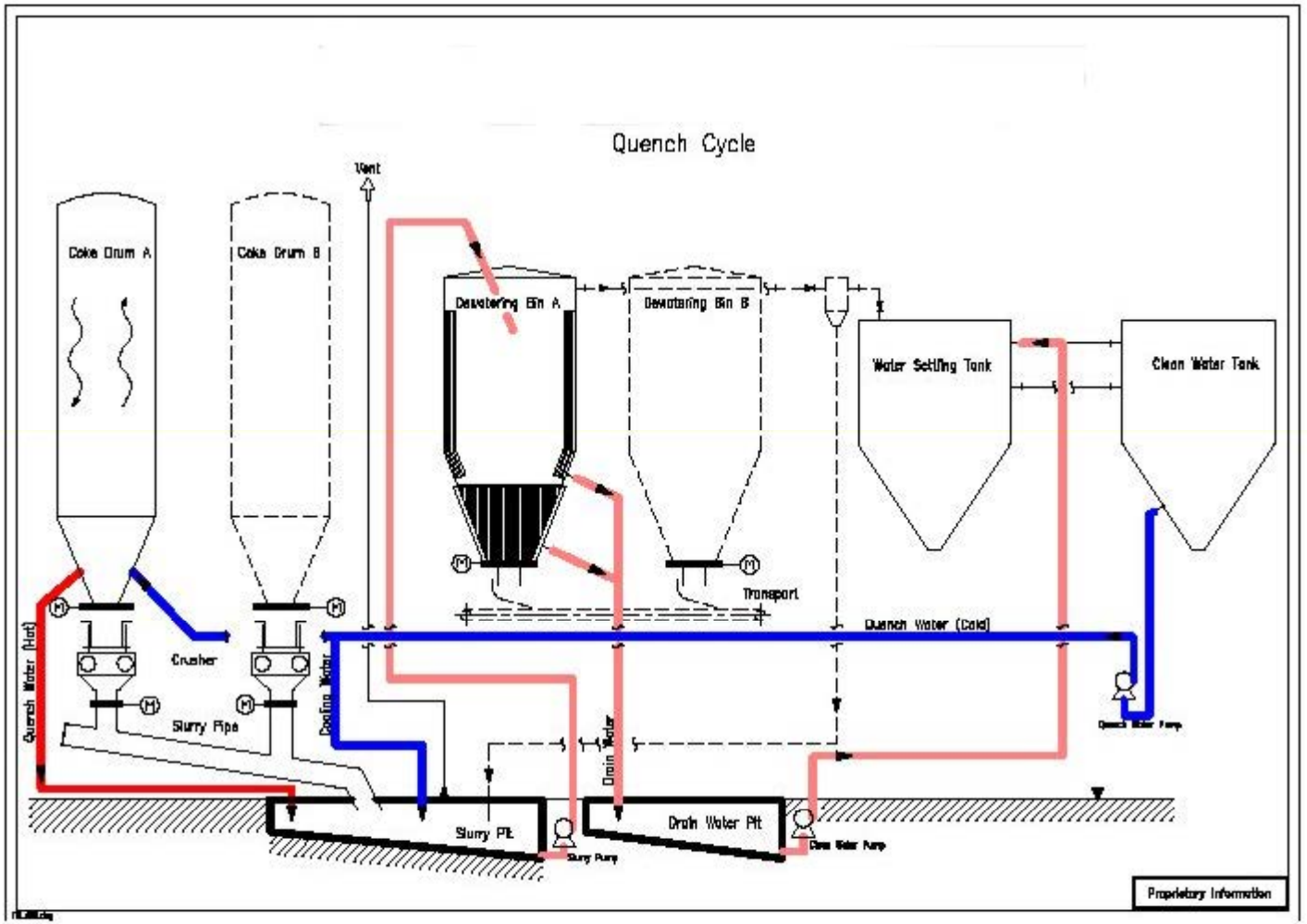

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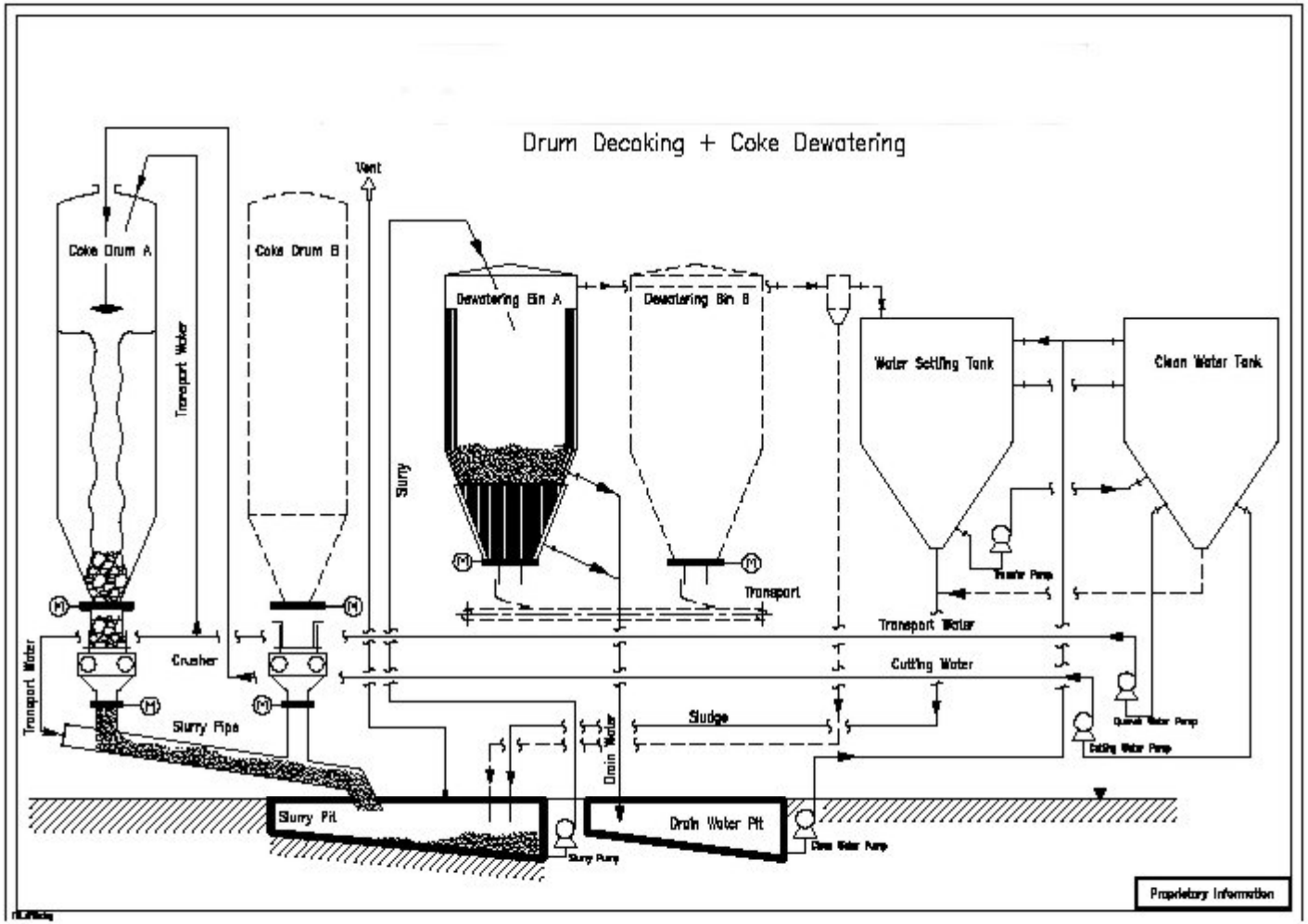

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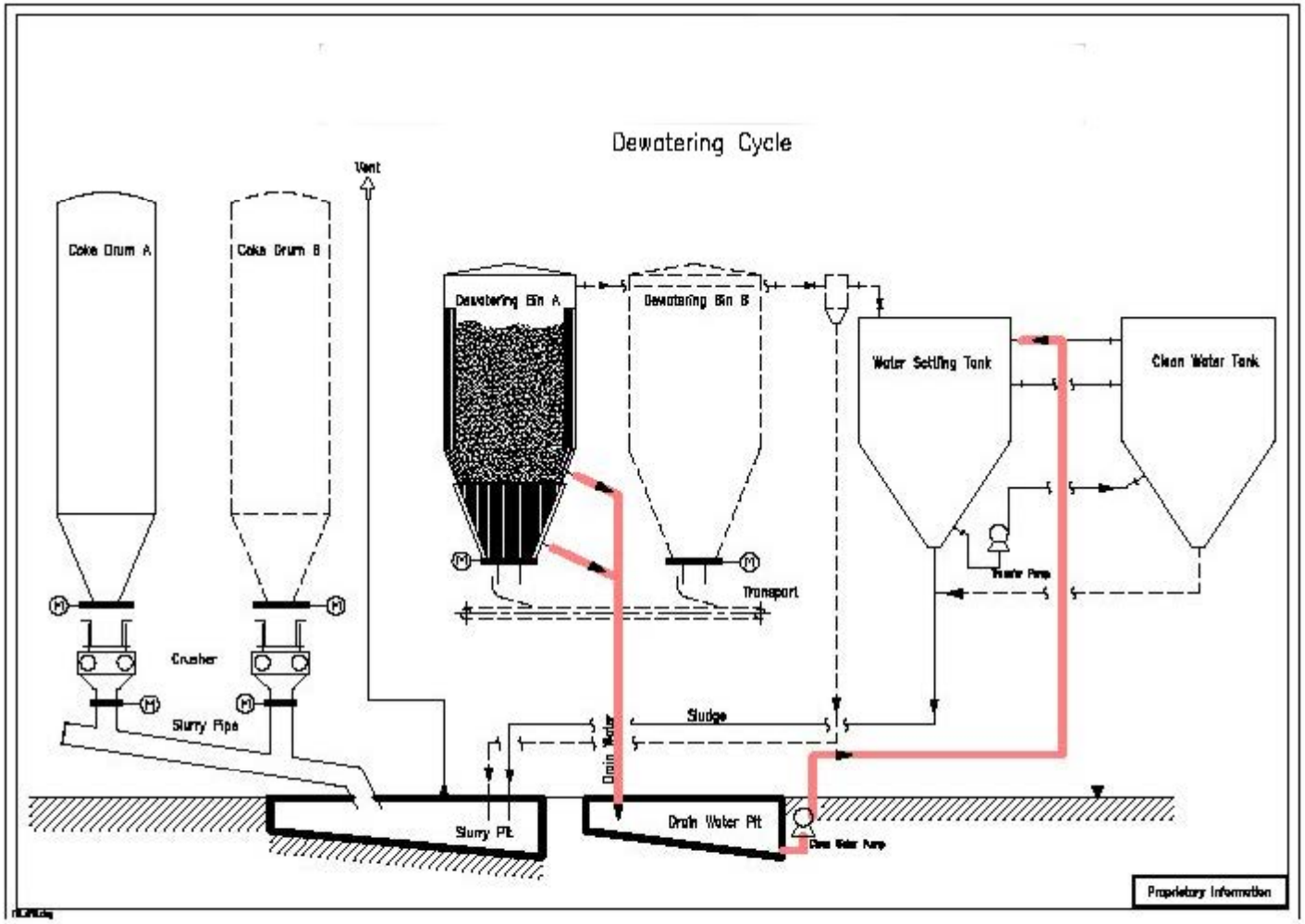


Time Schedule

Pit / Pat System vs CCS

Case: PIT / PAT SYSTEM

	hours	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Drum Decoking Drilling + Cutting into the pit	3	xxxx	xxxx	xxxx															
Coke Dewatering in the Pit	5	xxxx	xxxx	xxxx	xxxx	xxxx													
Coke removal out of the Pit into the Pad	5					xxxx	xxxx	xxxx	xxxx	xxxx									
Coke Crushing (external)	5					xxxx	xxxx	xxxx	xxxx	xxxx									
Coke Dewatering in the Pad	6						xxxx	xxxx	xxxx	xxxx	xxxx	xxxx							
Coke Transport/ Loading													xxxx	.....	.....	.....			

Case: CLOSED COKE HANDLING SYSTEM

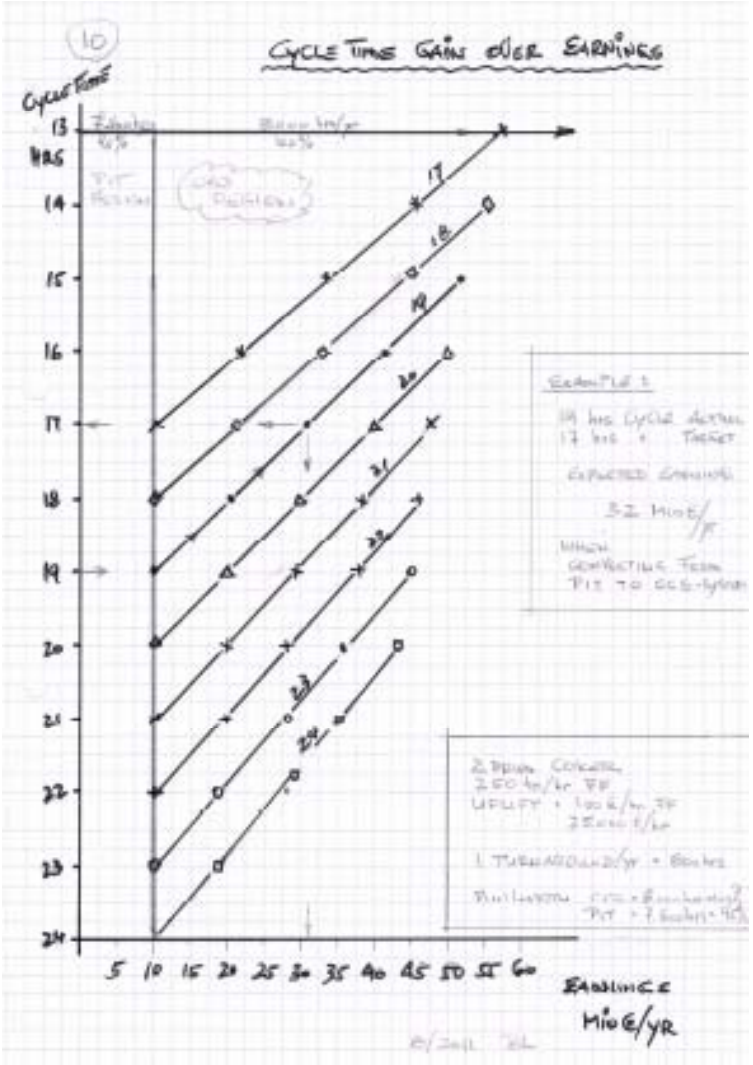
Drum Decoking Drilling + Cutting	3	xxxx	xxxx	xxxx															
Coke Crushing (internal)	3	xxxx	xxxx	xxxx															
Coke Dewatering in the Dewatering Bin	7	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx											
Coke Transport/ Loading									xxxx	.....	.....	.....							

Time Gain: 4 hrs

Special features & unique Equipment developments for 100% reliability & safety

- Scope and type of instrumentation enables fully automated DCS-operation
- Rigid crusher design & construction
- Crusher sizing and material selection to cope with maximum cutting capacity/ peak loads even for large drum outages
- Special system design & material selection for outlet valves and slurry pipe
- Slurry pump design, construction and material for ultra-low $NPSH_{req}$
- Special drainage design and materials for dewatering bins
- Coke fines management without active tank internals

Cycle Time Gains Over Earnings



Deliverables, Supply & Services in Co-Operation with Ruhrpumpen

Engineering deliverables:

- FEED Package preparation, fully spec'd

Supply of Single Source-/ Proprietary equipment at site

- Crusher (2)
- Slurry Pump (2)
- Dewatering Bins Discharge Valve (2)
- Crusher Outlet Valve (2)
- Telescopic Shute (2)
- Clean water Pump (2)

Additional services

- Gate reviews
- Commissioning
- S/ U assistance

Summary

The Closed Coke Slurry System International Patents pending **is…**

Safe →	avoids manual handling via DCS control/ clean workplace
Reliable →	allows sound cycle length planning long term basis
Ecological →	virtually free of emissions & steam plum
Economical →	enables up to 4 hrs cycle reduction -> fast payout Incidental cost savings for manpower & maintenance
Executable →	through close partnering with Ruhrpumpen, leading provider of coke cutting equipment
Attractive →	marginally higher initial investment than Pit design, but… Grassroots → Superstructure substantially lower, less plot Revamp → Tie-in within a planned T/A – Erection inside PIT

Thanks for your attention

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