

## Application story of CC-Link installation to paper and pulp industry

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### 1. Introduction

DCS (Distributed Control Systems) have been used since 1975 in the paper and pulp industry to automate their operations and to save labor and energy costs. Newly constructed process equipment now has significantly more automated points and digital control loops when compared to the earlier versions. Electricity industry has adopted early DCS direct transmission system connecting to MCC (Motor Control Center) to reduce control wirings of motor.

However, instrumentation signal processing still used point-to-point wiring between the I/O cards of the DCS or sequencer and the sensors/actuators. Therefore the wiring costs were not significantly reduced.

Paper and Paperboard Mill in Fuji of Oji Paper Co., Ltd decided to apply the CC-Link open field network to their pulp and paper process. The following section describes their selection process and the wiring of their system.

### 2. CC-Link Case Study

#### (1) Background

Oji Paper Co. planned to install a new paper machine. They assumed that the number of automated valves would increase. Therefore they reviewed the wiring system of the DCS and valves and decided to adopt a field bus system which would reduce the initial cost and installation time. They focused on the following 3 points for the decision.

- They needed a reliable, high performance network that was supported by a large number of companies offering a wide range of network-compatible products.
- They needed a high-speed network that ensured proper system operation and throughput.
- They needed a system that was easy to maintain and that would allow for future additions and changes.

Following 5 points were required especially for maintenance.

- It should be possible that a standby network master take control of the network in case the primary master experiences a failure.
- It should be possible to replace any network station without having to shut-down the entire network.
- It should be possible to replace a solenoid valve without having to shut-down the entire network.
- It should be possible to easily add network stations.
- The condition of input and output points should be easy to monitor by using a display device.

CC-Link has been chosen as the field bus system that meets the above requirements.

### (2) System configuration

Diagram 1 describes the system configuration of this application. The primary DCS is the CIEMAC-DS manufactured by Toshiba Corporation. The DCS communicates to MELSEC-Q series PLCs manufactured by Mitsubishi Electric Corporation using Mitsubishi's MELSEC NET/10 network. All of the solenoid valves and digital inputs are connected to the PLCs using the CC-Link network.

The manifold valves and digital input units are mounted on solenoid valve panels. The manifolds are connected to the pneumatic valves by pneumatic piping. 400 valves are connected to a single CC-Link network. Each CC-Link network uses 2 master cards to provide redundant network control.

### (3) Results

There have been no failures in the system in more than 1 year of satisfactory operation. The use of CC-Link and manifold valves eliminated the need for buffer relays in the solenoid valve circuits and also greatly reduced the amount and cost of wiring. Eight-block valve manifolds resulted in smaller panel size. In addition, the DCS is connected to the system via a network communication cable which also reduces cost and installation time.

Another advantage of the system is the ability to monitor and store useful maintenance information such as the number of times each solenoid valve has been cycled and how long the system has been operating.

## **~ CC-Link for more opening and globally ~ exhibition at SEMICON Japan 2002!**

CC-Link Partner Association (CLPA) will exhibit at "SMEICON-Japan 2002". The Marketing Task Force of CLPA will take the lead in showing at this exhibition. CLPA will show the advantage of CC-Link enables to collect high-speed data information, which is essential to EES (Equipment Engineering System) for semiconductor manufacturing equipment, with the 3 keys of "Solution", "New technology" and "Platform"

We will introduce the trend of advanced technologies including CC-Link system. Also more than 400 CC-Link compatible products will be shown on PC.

SEMICON Japan 2002

Date: Dec. 4(Wed.) – 6(Fri.) 10:00 a.m. – 5:00 p.m.

Place: CLPA booth Exhibition hall 4, Makuhari Messe, Chiba

**SAN realizes high-speed data transmission. It is CC-Link.**

**Now EES for semiconductor manufacturing equipment industry!**

Today's semiconductor manufacturing equipment industry is imposed large item small-scale production and needs a larger variety of processing technologies. Traditional production technology

just isn't enough to improve OEE (Overall Equipment Efficiency).

EES (Equipment Engineering System) is the vital task in solving these issues. It realizes status management of advanced process control and equipment. SAN gives the solution for EES with unprecedented high-speed transmission performance. It is CC-Link, the open field network.

### **New CC-Link compatible products!**

Followings are new CC-Link certified products.

#### **Belden Electronics Division**

CC-Link cable YR47205

CC-Link cable with built-in power cable YR47198

< Feature >

- They realize transmission speed of 10 Mbps of CC-Link Ver. 1.10.

#### **• MITSUBISHI ELECTRIC SYSTEM & SERVICE ENGINEERING CO., LTD.**

Low power wireless CC-Link unit 1216 Mhz

< Feature >

- Key station houses the CC-Link interface
- Slave station is capable of 32 input points and 32 output 32
- Simple communication
- No license is required to operate the radio frequency
- It is possible to communicate about 60 meters in and 100 meters out.

### **Establishment of a new CC-Link information delivery service**

CLPA has instituted a CC-Link information delivery service called "CLPA Plaza". It can be found on the CLPA web site: [www.cc-link.org](http://www.cc-link.org). It is designed to make it easier for you to obtain needed information on CC-Link. The Marketing Task Force of CLPA took the lead in providing this service.

Please use this service to receive CC-Link related information free of charge.

### **CLPA Plaza! Examples of information available include:**

New CC-Link product information, including the contents posted on CLPA web site.

CC-Link compatible products information manufactured by CLPA members

Information about the CC-Link related events and CC-Link educational seminars

Please note that you must register to use this service

### **CLPA Information**

The number of CLPA members: 333 companies (as of Oct.)

The number of CC-Link compatible products: 438 products

CC-Link Certified products manufactured by CLPA members have passed the official conformance

test. This test includes: noise immunity test, hardware and software test, combination test, inter-operability test and aging test.

For more details of CC-Link products, refer to the "Product information" posted on CLPA web site.

(CLPA web site: <http://www.cc-link.org>)

### **CLPA Schedule**

Dec.

4<sup>th</sup> –6<sup>th</sup> SEMICON Japan 2002

(Makuhari Messe, Chiba)

18<sup>th</sup> The 11<sup>th</sup> Technical Task Force meeting

Feb.

7<sup>th</sup> CC-Link basic seminar (Tokyo)

13<sup>th</sup> The 11<sup>th</sup> Marketing Task Force meeting

15<sup>th</sup> CC-Link seminar for developers (Tokyo)

19<sup>th</sup> The 12<sup>th</sup> Board of Directors meeting