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Foreword

Below you will find descriptions of automation and measurement projects where I have been involved. I have chosen to make a list with “type of projects” because a complete list over my projects would become very long. Furthermore, I do not believe that I am able to create it due to lack of memory. There are some more projects and types in my career, but they are very small or very similar to what I mention below.

In addition to the projects come several service assignments. Those I do not consider as projects, but has given a lot of experience too.

Log transporting systems for sawmills

Description:

A large number of log transporting systems for sawmills from different manufacturer from 1985 until today. Those systems include different types of machines for different transport tasks. Examples are single log feeders, log turners, log kickers and debarking machines. Frequency drives, measuring devices, sensors, switches etc. are used according to demands from end customer. Systems for operator communication have varied. From push buttons and light indicators over text based panels, to personal computers with operator systems installed or self developed application. User documentation written in Swedish and in some cases English.

Technique:

Simatic S5, Simatic S7, Melsec, SattControl, Modicon, Telemecanique, Ethernet, Profibus-DP, ProfiNet, Fipio, Siemens Corus LS-B, ProTool, WinCC, WinCC Flexible Advanced, Simatic operator panels, Bejer electronics operator panels, LED-displays, Simatic ProDAVE, Visual Basic, C, C++, Siemens ET200B, ET200S, ET200M, SEW Frequency drives, Schneider Frequency drives, Vacon Frequency drives.

My roles:

Development, Programming, Commissioning, PLC-hardware configuration, Service, Support (also remotely over VPN or phone modem), Project management, Documentation

Function library “log transporting systems for sawmills”

Description:

Developing and maintenance of function library (Simatic S5) used during 12 years in different log transporting systems for sawmills. User documentation written in Swedish only for internal use.

Technique:

Simatic S5

My roles:

Development, Programming, Testing, Documentation, Maintenance

Function library “log transporting systems for sawmills”

Description:

Developing and maintenance of function library (Simatic S7) used in different log transporting systems for sawmills. User documentation written in Swedish only for internal use.

Technique:

Simatic S7

My roles:

Development, Programming, Testing, Documentation, Maintenance

Log gap reducer for sawmills

Description:

A product, which constantly was developed, was a log-gap-reducing system for sawmills. It is used to minimize or stabilize the gap between logs in conveyors by using distance measuring devices, encoders and, where its possible, work with changes of speed for conveyors. Setup and production data via text panels. User documentation written in Swedish and English.

Technique:

Telemecanique TSX17, Allen-Bradley SLC 500, Simatic S7-314 IFM, Allen-Bradley DTAM, Simatic OP-7. Limab LMS 6024, Limab XLR30, Sick DME, IFM O1D405, RS422, Analog 0-10V, Analog 4 - 20mA

My roles:

Development, Programming, Commissioning, PLC-hardware configuration, Project management, Service, Maintenance

Simple log measuring systems for sawmills

Description:

Several log measuring systems for measurements with lower demands. Those measuring systems are useful for log turners and root end reducers. Most commonly used measuring device was beam-array-tubes, which allowed measure of lots of dimensions without touching the logs. Some applications made use of a double set of tubes to measure logs in two directions. Setup and production data via small text panels, or, at higher demands, via external PC. User documentation written in Swedish.

Technique:

Simatic S5, Simatic S7, Simatic OP-5, OP-7, OP-15, OP-17, Simatic ProDAVE, Visual Basic, Banner A-GAGE, Leuze, Analog 0-10V, ProfiBUS

My roles:

Development, Programming, Commissioning, PLC-hardware configuration, Project management, Service

Log sorters for sawmills

Description:

Those systems have handled two different tasks and therefore sometimes equipped with two PLCs. One task is the machine control. The other is the handling of data that each passing log generates. Data coming from one or more sources (measuring devices and operator) are collected. Data sent via serial connection to a PC, which evaluate the data and respond with an address for the log. Positions of logs are followed until the log has reached its sorting bin. User documentation written in Swedish and English.

Technique:

Simatic S5, Simatic S7, Visual Basic, RS232, Profibus, Banner A-GAGE, Leuze

My roles:

Development, Programming, Commissioning, PLC-hardware configuration, Project management, Service

Log sorter for sawmill approved by Swedish VMF¹

Description:

Log sorting line with data collection from operator and two scanners. Data following from operator over several gap reducing conveyors and a debarking machine. Last scanner is positioned after debarking. The 3D-scanner, from Canadian MPM, was reading and writing the PLC via Ethernet. Sorting into 50 different bins. Complete set of data for each log reported via LAN to the customers business system. Production data and operator communication via WinCC. This project included only indirect machine control. For example, speed changes of conveyors for optimization of log gap and log kickers.

Technique:

Simatic S7 416, WinCC, Profibus-DP, Ethernet, Siemens ET200M, RS232, RS422

My roles:

Development, Programming, Commissioning, Project management, service.

Saw lines

Description:

Saw lines with one or more pairs of reducers and one or more sawing groups. Sawing information coming over Ethernet connection from operator software made of different companies. Each log are at all time positioned in the saw line to achieve the correct cutting in the sawing machinery.

Technique:

Simatic S7-300, Simatic S7-400, Profibus-DP, Siemens ET200B, RS232, Analog 4-20mA, Vishay Nobel Hydraulic Servos, Heinola electrical servos, Networking

My roles:

Development, Programming, Commissioning, Project management, service.

¹ VMF Virkes Mätare Föreningen. An independent and objective organisation that is working with measuring and grading wood that landowners deliver to saw- and paper mills in Sweden. They have specific demands on the equipment the use.

Saw line for fence pole production

Description:

A simple saw line with two pairs of reducers and one profiler with possibilities to split the log. The rotation speed of reducers was depending on line speed. The positioning of the reducers was handled by two separate, smaller PLCs. Production data constantly transferred to a business system via serial link.

Technique:

Simatic S5-115, Simatic S5-95u, OP-15, OP-5, Profibus-DP, Siemens ET200B RS232, Analog 4-20mA

My roles:

Development, Programming, Commissioning, Project management, service.

Pole manufacturer machines

Description:

A couple of pole manufacturing machinery. Those projects combines debarking, length measurement, diameter measurements, graphical operator interfaces, servos for positioning of poles, servos for positioning of cutting tools, stations for manual work and sorting.

Technique:

Telemecanique TSX17, SattControl, Simatic S5-95u, Simatic S5-115, Profibus-DP, Profibus-FMS, Siemens ET200B, Simatic ProDave, RS232, Visual Basic, Analog 0-10V

My roles:

Development, Programming, Commissioning, PLC-hardware configuration, Project management, Service

Board sorting/handling for sawmills

Description:

A couple of board sorting and handling systems from different manufacturers. Those systems have included destacking, measuring systems, servos for positioning, operator input, sorting and stacking.

Technique:

SattControl 15, Melsec A2, Simatic S5-115, Profibus, Siemens ET200B, RS232

My roles:

Development, Programming, Commissioning, PLC-hardware configuration, Project management, Service

Laser based measurement systems for different kind of production lines

Description:

The systems from the Swedish company Limab AB are used in several different branches. Sawmills, gypsum board factories, steel mills are a few examples. The different systems can have from 1 up to 10th (my personal record are 26) of connected laser based distance measurement sensors. In addition to this, often are encoder or Laser Doppler used to add more possibilities to the measurement. As main unit for a system are normally a PCs running under Windows used. Over the time, several different Windows versions have been used. From Windows 2000 to Windows 7. All data are collected in the main unit and the result are stored in different ways (databases or simple texts files) and also delivered to higher level computers over serial connection or network, depending on system and customer claims. Some systems also receive additional data from higher level computers.

Some systems have been completely tailor-made for the customer.

Technique:

PC, CAN-Bus, Ethernet, Databases (MS-SQL and MySQL), Windows 2000, Windows XP, Windows Vista, Windows 7, Limab Precicura, Limab Accura, Limab Accura VSE, Limab LMS 6044, Limab LMS 6045, Limab LCU, Limab LMS 6035, Limab LMS6035VSE

My roles:

Improvements, Installation, Commissioning, Service, Teaching

Non-destructive material test equipment**Description:**

A couple of small machines where metal objects are scanned and checked for production damages and lack of quality. Those machines were placed as part of complete production lines. This demands communication with robot cells and other equipment. This was done via parallel protocol. The PLCs have in those projects, handled both machine control and the test results.

Technique:

Simatic S5-95u

My roles:

Development, Programming, Commissioning, Service

Strength grading equipment for sawmills**Description:**

Measurement systems using dynamic analysis for on-line product classification of wood-based materials from the Swedish company Dynalyse.

Technique:

Windowbased industrial PCs, RS232, Analog 4-20mA.

My roles:

Commissioning, Service, Teaching

Water cleaning Plant**Description:**

Small water cleaning plant with two separate station around 3 kilometers apart. One PLC in each station communicating with each other over serial link with radio modems.

Technique:

Simatic S7-300, RS232, Radio modems, Analog 4-20mA

My roles:

Development, Programming, Commissioning, Project management, service

Water plant**Description:**

A project to change the hardness of the produced water. One part of the automated machinery created a thick lime mixture. This mixture and carbon dioxide was added to the produced water. A software PID-regulator controlled this.

Technique:

Simatic S5-135, Analog 4-20mA

My roles:

Programming, Commissioning, Service

Pallet machinery

Description:

All between smaller machines for partly production of pallets to complete lines for pallet production. A machine for pallet production consists of several different types of tasks. Some examples are stacking, destacking, one by one picking, positioning, automatic nailing etc. Those projects include a big part of communication between the Swedish machine manufacturer and the German pallet producers.

Technique:

Modicon PLCs, Modicon XBT-terminals, Safety products from Telemecanique, Jokab safety and Smartsan

My roles:

Montage assistance, Commissioning, Teaching, Documentation, Service

Paint shop for car industry

Description:

One transport system for skids with bodies in one direction and empty skids in the other direction and one automatic storage for empty paint-skids. The transport system and the storage included elevators, turn boards, lift boards, skid stackers and more. Final program make use of programming standard B03 from Siemens and Daimler-Chrysler. Frequency drives from Danfoss controlled over Profibus.

Technique:

Simatic S7 417, Simatic OP-17, Profibus-DP, Siemens ET200s, Siemens ET200s motor starters, Siemens SIGUARD, Siemens SIGNUM, Danfoss frequency drives

My roles:

Programming, Commissioning