

**PRINT PRODUCTION AUTOMATION: A CASE STUDY OF
METROPOLITAN FINE PRINTERS**

by

Velma Larteley Larkai

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Approval

Name: Velma Larteley Larkai
Degree: Master of Publishing
Title of Project Report: Print Production Automation:
A Case Study of Metropolitan Fine Printers

Supervisory Committee:

John W. Maxwell
Senior Supervisor
Associate Professor & Director
Master of Publishing Program
Simon Fraser University

Roberto Dosil
Supervisor
Senior Lecturer
Master of Publishing Program
Simon Fraser University

Mike Winteringham
Industry Supervisor
Chief Operating Officer
Metropolitan Fine Printers

Date Approved: March 4, 2015

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Abstract

The use of Management Information Systems (MIS) in improving organizational efficiency and productivity is one trend that has gained much traction in the print industry. MIS' outstanding capabilities have demonstrated to be not just a better alternative to manual production workflow processes, but a necessity for print firms seeking to survive and thrive in an increasingly competitive sector.

This report presents an investigation into how a Vancouver-based print company, Metropolitan Fine Printers (MET), achieves workflow automation through the use of MIS. It examines the introduction and implementation of MET's first MIS, *Hagen*, and discusses the system's capabilities, revealing the deficiencies that called for an upgrade of *Hagen* and its integration with other models, to give the new MIS system, *Monarch*, the potential to automate the workflow process of the company. The report then provides an assessment of the impact of *Monarch* on the company's operations and presents the level of MIS integration within the company by examining work tasks completed by employees through the use of the system. In addition, it analyzes employee's reaction and experience with *Monarch* and outlines the system's weaknesses. The report concludes by presenting recommendations and strategies that MET could consider for enhancing its operations.

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Also to my supervisors, John Maxwell and Roberto Dosil, I am honored for your guidance and mentorship throughout my study.

Finally to my family, friends, and fellow MPubbers, I am thankful to you for the diverse assistance you offered me to finally get this work completed. This couldn't have been possible without you all. I have finally made it through!

Dedication

I dedicate this report to my family and that of the Smith-Essehs. Your love, passion and belief in me have been nothing but extraordinary.

List of Acronyms & Abbreviations

ALQ: Approved Letter of Quote

BOD: Board of Directors

COO: Chief Operating Officer

CI: Continuous Improvement

CRS: Customer Relationship Software

DMI: Direct Machine Interface

EPP: Electronic Prepress

HR: Human Resource

IT: Information Technology

MET: Metropolitan Fine Printers

MIS: Management Information System

RFQ: Request for Quote

UV: Ultraviolet

UPS: United Parcel Service

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Introduction

In this competitive age, where efficiency automation has become a key requirement for remaining viable in the print production business, companies have resorted to various technologies that facilitate the production process in order to meet customers' expectations. One major trend is the adoption of automated systems, typically Management Information Systems (MIS), to enhance and manage workflow systems while maintaining quality standards. This technology is continually evolving and since its adoption, print houses are still exploring its full potential. It is therefore, imperative to investigate the system's performance, assess its impact on production, and examine its transformative impact on print production activities.

This report is organized in five chapters and provides analyses of the two versions of MIS, *Hagen* and *Monarch*, adopted by Metropolitan Fine Printers (MET¹).

Chapter one begins with an overview of MET, highlighting its background, internal organization, structure and functional style. Chapter two has two foci; the first looks at the importance of MIS to the print industry and the second specifically examines MET's adoption and implementation of *Hagen*, its first MIS. This is followed by a description of the company's new workflow process including an analysis of the system's capabilities and limitations that led to the need to upgrade and integrate *Hagen* with other workflow modules to achieve full automation.

¹ Metropolitan Fine Printers is also known as MET and used as the company's acronym.

Chapter three examines the implementation of the upgraded MIS, *Monarch*, including a discussion of the various modules that work together to make the workflow fully automated. It further describes MET's new automated workflow and assesses the impact of *Monarch* on the company. In chapter four, the operational realities of the *Monarch* MIS is scrutinized. Here the company's level of MIS integration is evaluated alongside the implementation challenges faced by management. It also presents employees' experience with the *Monarch* system performance and limitations. The final chapter, five, provides a summary of findings as well as recommendations for considerations by MET.

In addition to serving as a good reference material for students interested in print production automation technologies, this report could also be a useful source for technology firms developing updated MIS versions and related systems.

Chapter 1: Overview of Metropolitan Fine Printers

1.1 About the Company

Metropolitan Fine Printers (MET)—located in Vancouver, BC, Canada—is one of North America’s leading print firms that provide some of the highest quality print solutions. Founded in 1977 by George Kallas², MET has grown to become a multinational print company with branches in Calgary, Victoria, Portland, Seattle, San Francisco and Honolulu. With a drive for continuous improvements, MET has garnered a solid company reputation serving prestigious clients throughout Canada and beyond.

MET is a high-end printing company that provides services in book and catalogue printing, packaging and point of purchase display, direct mail printing, custom digital printing, environmental and corporate reports, large format printing and vinyl installation, as well as fine art and poster printing. The company’s products, which sets MET apart from other commercial printers, is its standard for top quality printing combined with traditional bindery to produce elegantly crafted cultural products, otherwise known as *boutique projects*. MET has two sites in Vancouver with a total physical size of 29,000sq. ft.³

² George is now acting as one of the Board of Directors of the company. Scott Grey, Interview by Velma Larkai, Vancouver, BC., June 16, 2014

³ 22,0000 sq. ft. for the main site and 7,0000 sq. ft. for the second site.

1.2 Mission and Vision

The vision of the company, according to its mission statement, is: *To Lead the World with the Finest Innovative Communication Experiences*. To realize this vision, MET keeps abreast with emerging trends and adapts to innovative strategies that place the company at a competitive edge. Rather than being complacent about past achievements, MET builds on its experiences, committing to continuous improvement in its operations and output, and takes on challenging tasks that test its creative and strategic savvy. MET is interested in providing a complete communication experience—walking clients through every step, offering constructive suggestions, and contributing to the overall design of a project⁴. MET believes in and prioritizes establishing good, long-term relationships with clients and partners by providing them with rich, insightful experiences that exceed their expectations.

⁴ Scott Gray, interview by Velma Larkai, Vancouver, B.C., June 16, 2014

1.3 Structure and Functional Style

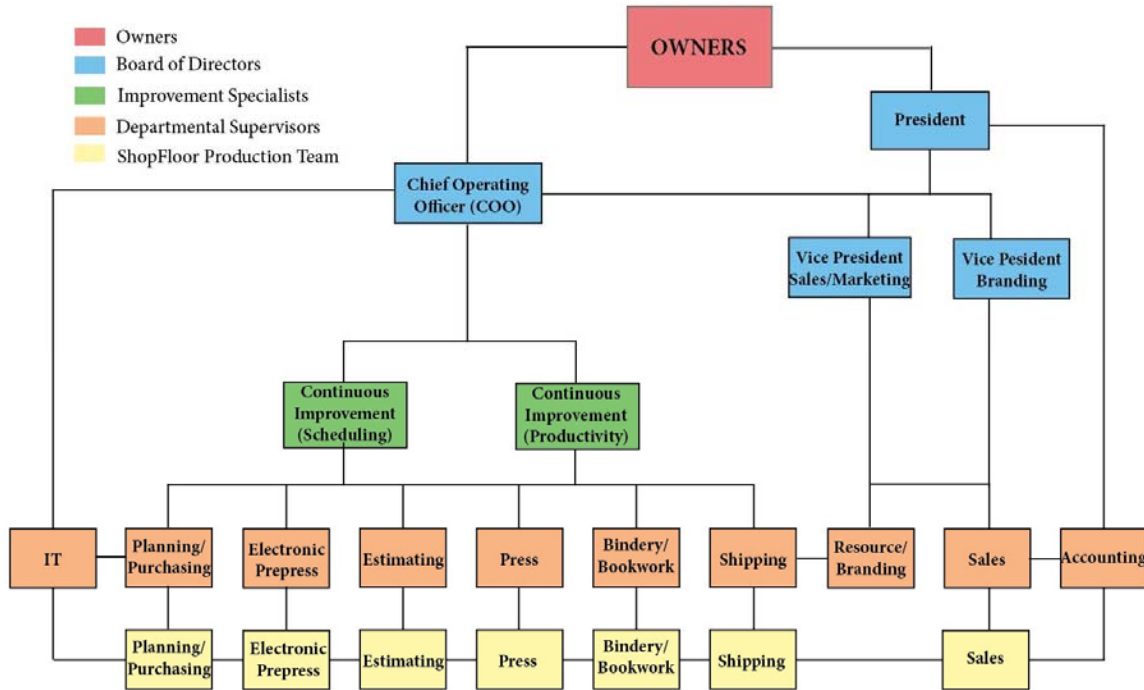


Fig. 1 Chart showing the organizational structure at MET. [Source: Velma Larkai, January 2015].

MET is headed by the owner (George Kallas) but managed by the Board of Directors, which is comprised of the president, two vice presidents and the Chief Operating Officer (COO) (Fig. 1). Although this board serves as MET’s main decision makers, the president is not directly involved with the day-to-day running of the company. Moving down the hierarchy are the Operations Scheduler/Continuous Improvement Officer and the Productivity Specialist who coordinate with the COO and production departments⁵, to ensure that all projects are carried out to meet company’s standards. Next on the level are the ten departments with corresponding heads to ensure that employees complete their duties in the most efficient manner possible.

⁵ The production departments include Planning/Scheduling/Purchasing, Estimating, Electronic Prepress, Press, Bindery/Bookmaking and Shipping.

Each project is broken down into individual tasks for the various departments to complete. While some of the tasks need to be completed before other tasks start in other departments, there are certain tasks that can be run simultaneously across departments.

The channel of communication that exists at MET can be described as a mixed approach where workers are expected to report directly to their superiors but are also permitted, when necessary, to report to anyone along the structural hierarchy when the need arises. MET can be likened to a family company where employees are given lots of room to operate and unearth skills to the company's benefit.

Of the fifty-three employees that make up MET's dynamic workforce, ten have worked with the company for over twenty years, ten for over fifteen, and fifteen have been with the company for a duration of five years or less. These figures are reflective of a friendly and nurturing environment, as well as the good remuneration and working conditions MET has created for its employees over the years. In addition, MET is committed to ethical business practices and holds itself to the highest standards—evidenced by MET being the first commercial printer in Canada to receive the Ethics in Action Award⁶.

⁶ Ethics in Action Award built upon the Dalhousie Business Ethics Case Completion (DBECC) to reward outstanding companies that make complex business decisions while adhering to ethical principles. [Source] *Award: Ethics in Action*. <http://ethicsinaction.ca/award> (accessed October 23, 2014).

1.4 Departments and Their Functions

MET is made up of ten departments that perform specific tasks and work in tandem with other departments to complete the production workflow right from the point of job creation to delivery. A description of the functions of these departments will provide a better understanding of the relationship that exists between departments.

The departments include:

- Branding/MET Resource
- Sales
- Estimating
- Planning/Scheduling/Purchasing
- Electronic Prepress (EPP)
- Press
- Bindery
- Shipping and Fulfillment
- Information Technology (IT)
- Accounting

1.4.1 Branding/ MET Resource

This is one of the smallest departments at MET. It is made up of just one person, who serves as the company's representative to other stakeholders. This employee is in charge of managing the brand of the company and is responsible for anything that bears the company's identity. He can be described as the company's *Logo Police*⁷, who monitors the use of the company's logo, be it inside or outside the company.

⁷ Scott Gray, interview by Velma Larkai, Vancouver, B.C., June 16, 2014

He is responsible for contacting designers and marketers and developing a cohesive brand language to promote the company, developing advertising, sponsorship and marketing strategies plus collateral that advances the company's position in the market. He also develops social media strategies to promote MET's services and expand its audience reach. Another major function he performs is the management of MET Resource⁸, to customize, launch, maintain, and host a web-based library that is unique to each client.

1.4.2 Sales

The sales department is comprised of ten account executives that are at the front-end of the production workflow. They are the initiators of every job, and are responsible for attracting customers to MET. They are motivated to use relationships to generate more sales for the company.

Members of this department present the company in an honest, forthright manner, and are charged to build long-term relationships with clients. They are expected to protect the company from any liability that might develop during the production process of projects and serve as a liaison between the company and the client⁹. Sales personnel communicate with clients on a regular basis keeping them informed of the status of their projects. They work closely with other departments to ensure specifications are met on each job during the production process.

⁸ Met Resource is now an extension of MET that focuses on providing branding services to clients. [Source] MET Fine Printers. *Service: Met Resource*. <http://www.metprinters.com/our-services/met-resource/> (accessed May 28, 4014).

⁹ Bob Faulkner, interview by Velma Larkai, Vancouver, B.C., July 16, 2014

1.4.3 Estimating

This department is made up of two estimators that prepare project quotes within the time frame provided by clients and tailored to their specifications. They understand the production workflow of each job, and are constantly abreast of the price of materials and labour required to get projects completed. The more detailed the specifications, the easier it is for estimators to generate a quote¹⁰. MET's estimators work in direct contact with planners and sales representatives, who provide them with job details and are also able to interpret estimations for clients. The estimators also provide advice to clients on the most suitable production approach.

1.4.4 Planning/Scheduling/Purchasing

This is a three-in-one department made up of six employees and can be described as the workflow development hub. The job categories include job planning and co-ordination from its initiation to delivery, scheduling and paper purchasing. Since these functions cut across all departments, planners and schedulers have a vast knowledge about the production process and the capabilities of every department. They plan and co-ordinate job workflow, monitor and ensure that each department fulfills its work in a timely manner by communicating frequently with the head of each department. They also keep track of time, materials, etc., invested in each project, making sure it meets the company's financial target.

¹⁰ An estimate of a job based on materials and time to be invested in the execution of the project.

1.4.5 Electronic Prepress (EPP)

This department is made up of four experts in graphic design who refine design files supplied by clients prior to going into prepress. Their responsibilities include image restoration and retouching, and colour correction and management. They also manage preflight and imposition software, produce contact proofs for colour review and approval, and create low-resolution proofs to show content and paginations. New proofs are produced whenever errors are noticed until approval to proceed with printing is given by the clients. The EPP works with all other departments, but they are in most frequent contact with the sales, planning and press departments.

1.4.6 Press

The press unit consists of six pressmen who run the printing presses

- one five-colour waterless UV offset (KBA Genuis 52)
- two eight-unit perfecting offset (MAN Roland R 708)

These pressmen conduct frequent press checks and maintain equipment at the highest possible standards in order to produce consistent quality. Although they face a myriad of challenges when executing their printing tasks, they stay on top of technology by implementing immediate solutions and techniques to maintain consistent print quality. The pressmen work directly with the EPP, bindery, planning and sales departments.

1.4.7 Bindery/Book Making

This department is the last one in the production chain. It is made up of eight staff members who carry out various bindery activities such as gathering, folding, trimming, scoring, stitching, etc. The bindery machines include:

- cutter (Polar 137 ED)
- continuous feed folder (MBO Navigator Perfection)
- rotary scoring machine (Rollem TR)
- saddle stitcher with three-knife trimmer (Muller martini 1528)
- perfect binder (Sulby)
- multi binder (Duplo)
- single-head hand sticher (JL Morrison)
- double-head hand sticher (Acme Interlake)
- shrink wrapper (Seal-A-Tron S-1620)

The staff of this department also engage in handwork of high aesthetic nature, including sewing, foiling etc. They work closely with all other departments to ensure that the results of their activities are in accordance with the right specifications of the job and meet the client's needs.

1.4.8 Shipping and Fulfillment

The shipping department is one of the most crucial departments at MET, and is comprised of two employees responsible for delivering finished products to clients in the best condition possible. They are responsible for shipping as well as receiving ordered (purchased) materials—ink, paper, and sub trades—by the company. The shipping department works closely with shipping companies contracting out various transportation means, including water, land, rail and air, depending on which option

is most convenient. The department ensures that all shipping arrangements, whether receiving or dispatching, comply with all customs and logistic procedures.

This department is also responsible for warehousing and fulfillment, including the storage of overruns of printed jobs, which are kept and released to clients based on orders received. Internally, they liaise with the planning, press and bindery departments to get the right information in carrying out shipping orders and communicate with clients directly when clarification is needed or more details are required.

1.4.9 Information Technology (IT)

MET's IT department, which could be described as the backbone of the company, is handled by a single employee. Although the output of the department seems invisible to the production workflow, its services play a significant role in the success of every department. The IT head ensures that all electronic equipment—be it computers, telephone devices, printers etc.—are fully operational and perform according to expectations. His experience enables him to work with a variety of software programs—about fifteen—used by MET and he is on call to troubleshoot them all. He provides installation and upgrades of software for each department. He also manages the internal email server, which facilitates electronic communications within the company.

1.4.10 Accounting

The accounting department, with a staff of two employees, handles the finances of the company. Their responsibilities include reviewing job dockets, posting purchase orders and invoices into the MIS, issuing cheques to vendors, receiving or making calls on payment issues, and managing MET's payroll. They also take on Human Resource (HR) duties and work with all departments in any billing related issues.

The next chapter provides an overview of MIS and its purpose and examines the introduction and implementation of MIS at MET, including the workflow and how the various departments work together using the MIS. It also discusses the benefits and limitations of the system, highlighting the need for the system's upgrade.

Chapter 2: Management Information Systems

2.1 Overview of MIS in the Print Industry

The print industry is constantly faced with competitive pressure, technological challenges, global integration, and shorter runs among other challenges. To remain competitive as well as relevant in this dynamic and growing field, the printing industry has in general adopted technological systems to enhance efficiency and productivity and promote growth. Management Information System (MIS) is one real-time information solution that has gained a foothold in manufacturing industry and is gradually gaining ground in the print industry.

Print MIS can be defined as a print production automation system specifically designed with the tools to organize, evaluate, and efficiently manage departments within an organization to enhance print production operations.¹¹ Just as the printing business has evolved, so has the Print MIS, which was first developed in the mid 1970's¹² with an original focus on estimating, invoicing and accounting. The advent and use of computers over the years has facilitated the integration of MIS within the various departments of a commercial printing company. MIS is a combination of five primary elements consisting of hardware, software, data, procedures and people.¹³ It integrates data from all departments and provides past, present and predictive

¹¹ EFI, "ABC's of Print MIS: MIS Profit Focused Print Management," pp3

¹² *ibid.* pp5

¹³ Kroenke, David M, Gemino, Andrew C. (Andrew Carlo), Tingling, Peter M. (Peter Maxwell). 2014. "Experiencing MIS". Toronto: Pearson Education, pp6

information required to effectively run the plant on a day-to-day basis, as well as support strategic, long-term growth decisions.

MIS technology is designed to fit into every aspect of a commercial printing operation as an integral part of the production workflow. Each type of MIS has a wide variety of functions; however, the basic capabilities of such a system include estimating & quoting, order entry & job tracking, raw material inventory, production floor data collection, invoicing & receivables, job history and costing, standardized reports, receivables, payables, general ledger and financials.

Other sophisticated features which may not be included in all versions of the MIS include intelligent specification tools, client access for order management and finished goods inventory management, computer-generated production forms, dynamic scheduling, direct machine interfaces (DMI) for data collection directly from presses and other equipment, radio frequency inventory management, client access for finished goods inventory management, flexible financial reporting, employee, equipment, sales analysis, database extraction and custom reporting tools.¹⁴

In an industrial and technological economy where businesses keep expanding, MIS is not just an alternative management tool to remain competitive, but a necessity for every print company to survive and thrive. A study undertaken by Vision in Print in 2006¹⁵ shows that almost all printing companies with staff strength of more than forty employees have acquired MIS as a means of improving speed and efficiency of

¹⁴ EFI, "ABC's of Print MIS: MIS Profit Focused Print Management," pp9

¹⁵ Vision in Print, "Management Information systems: Guide to Effective MIS Use for Printers", pp9

administrative processes and to analyze profitability of job types/customers/market sectors to establish the profit and loss generators for their company.

2.2 Introduction of Hagen MIS in MET

In February 2002¹⁶, MET decided to invest in MIS technology, specifically *Hagen* from EFI. The objective was to replace the tedious manual system of recording and managing projects and production process from job acquisition to delivery.

Computers were only made available to the accounting department. Very limited information was entered into a terminal using barcodes. This system did not allow for the recording of detailed information relating to production, planning, sales, etc. Furthermore, the only thing that could be retrieved was docket numbers, as the company relied on the use of hand-written job dockets (known as hand dockets). Job specifications on the dockets had to be crossed-out and rewritten if changes were made to the project.

Costing and estimating were done manually and then relayed to the accounting department. The process was very tedious and time consuming. When clients approved of a job, the estimates and final costs were merged and compared with cost sheets provided by the accounting department for invoicing. The accounting department was the only source of information for cost sheets. Since these cost sheets were manually generated, the information captured contained errors and took a lot of time to fix.

¹⁶ Anita Tuner, interview by Velma Larkai, Vancouver, B.C., July 7, 2014

There was poor coordination between departments since it was very difficult to track job status and changes, leading to errors and wasting of time and resources. The company was unable to generate accurate reports or effectively evaluate each department's performance in relation to their tasks and responsibilities. MET was in a very difficult state and needed an immediate solution to improve their workflow. MET therefore needed a system to enable the company to strengthen its workflow process and improve coordination among employees. It also needed to generate real time reports to analyze productivity with the aim of maximizing return on investment.

After several meetings, research and deliberation, the company decided to invest in *Hagen*, a print MIS that provided a great leap for the company to automate its production processes.

2.2.1 Implementation

Hagen is a central system for storing and retrieving project information right from acquisition to delivery. Within *Hagen* are various features for carrying out project estimation, planning, and management, as well as generating purchase orders and accounting functions. A major feature of *Hagen* is the *ShopFloor*, which allows employees to key-in time and materials spent on each stage of a job for billing purposes.

The implementation of *Hagen* was a very slow process at MET, as most of the staff members were new to the use of computers. First, an implementation team was set up to assess the whole system and outline ways of getting employees trained on the use of the system. The software was installed on every computer with restricted access to

certain components depending on the employee's expected functions and use of the system. The software developers carried out an intensive training regimen of the Estimator and Chief Operating Officer (COO). After this was staff training sessions led by the COO, who introduced the system, functions and data entry processes through demonstrations.

The next step was to hold individual and group training sessions, where the members of each department were guided through various steps of operating the components of the system that related to their individual tasks. The purpose was to keep a digital record of everything in order to phase out handwritten records. Some employees were quite resistant to the use of the system, although they eventually decided to give it a try. The adoption of the system was gradual; employees started by working on simple jobs and then built on to more complex tasks. Although the *Hagen* system was introduced as an entirely different system for getting jobs completed, it presented itself as a great tool to reduce the laborious process of recording and management projects at MET.¹⁷

2.2.2 Workflow Description using *Hagen* MIS

With the introduction of the new system, the production workflow began to change for the better. Manual operations were replaced, although some manual aspects of the company workflow were still maintained. Over a decade of adoption, *Hagen* facilitated the automation and completion of employees' daily tasks by 25%¹⁸. A typical illustration of the *Hagen* MIS production workflow is as follows (Fig. 2):

¹⁷ Anita Tuner, interview by Velma Larkai, Vancouver, B.C., July 7, 2014

¹⁸ Alex Neubauer, interview by Velma Larkai, Vancouver, B.C., July 17, 2014

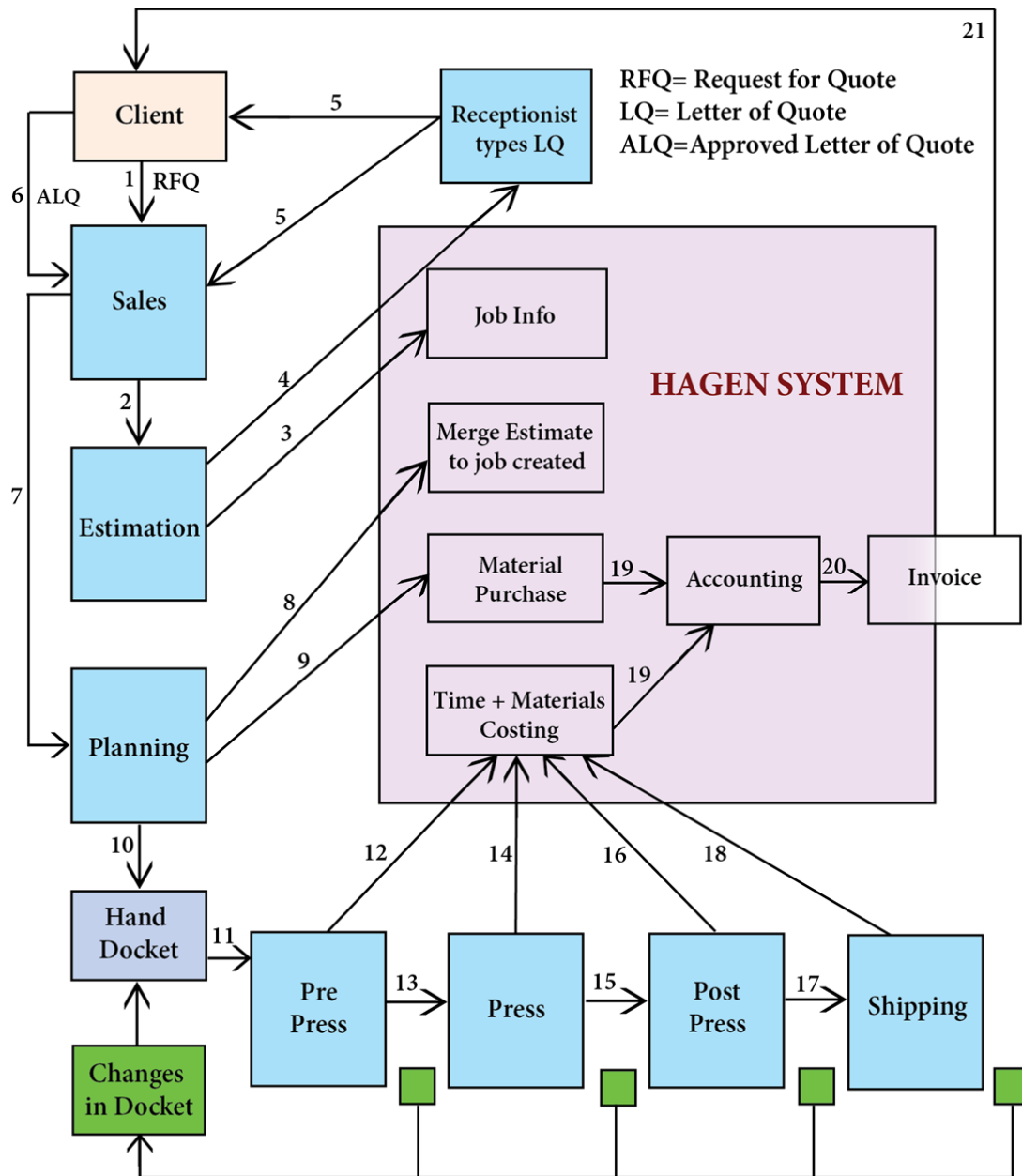


Fig. 2 Workflow chart describing the use of Hagen MIS at MET. [Source: Velma Larkai, October 2014]. The numbers indicate the sequence of steps in the production process.

Clients request a quote (RFQ) through the company's website. The sales representatives receive the RFQ form at the back end and forward it to the estimating department by email or hard copy format. The estimator enters the project specifications into the *Hagen* system and then develops an estimate based on the specifications, materials and time required in producing the project. A handwritten copy of the estimate is typed out by the receptionist and the digital version is emailed to the client for approval. Upon the client's approval, the planners refer to the details on the estimate sheet to plan the workflow process. The job specifications, already entered into the *Hagen* system, are merged with those on the approved quote sheet if there are more details. This is when a job is officially accepted and given a docket number for production to start.

Planners create a job docket comprised of basic but very important information about the project. These include the project title, printing run, colour specifications, and finishing, among other details. This basic information is printed on a sheet and pasted onto an envelope that serves as the carrier of clients' files that goes through the various departments so the employees involved in the project know the project's specifications and their role in the workflow.

The planners manually plan out the job and develop imposition layout¹⁹ since *Hagen* does not support this process. The scheduler manually plans out schedules using a board and a excel spreadsheet bases on the planning details of the job. He then makes the schedule available to all involved in the particular project. The EPP department

¹⁹ Arranging more than one page layout on a bigger sheet, in such a way that the page numbers will follow sequentially when folded and trimmed.

retouches images and corrects the content of the files received from clients if necessary. A proof is then sent out to the client for review and approval. Upon approval, printing plates are produced. The pressmen prepare the 'make-ready'²⁰ to initiate the actual print run, and a client representative is called to view a make ready press sheet sample to ensure that the final printing meet expectations. Upon the client's approval, the pressmen proceed with printing the job and send the signatures²¹ to the bindery for finishing. The bindery executes finishing activities such as gathering, folding, trimming, stitching, scoring, foil stamping, etc., based on the specifications of the client. The shipping department then packs and delivers the finished job to the client.

As the docket moves by hand from one department to another, each employee relies on the information and documents contained in it for details. They then log into *Hagen* to post their production information (time and material used) for job costing. The accounting department feeds on the data in *Hagen* to generate invoices.

2.2.3 Capabilities and Advantages

The introduction of the *Hagen* system at MET, despite not being perfect, eased production workflow management, bringing substantial improvement to the company's operations. The key specific benefits Hagen brought to MET are:

²⁰ Set up the printing press for running the job.

²¹ A group of pages that are printed on both sides of a single sheet of paper that once folded, trimmed, bound and cut, become a specific number of pages depending on the page size and the size of the press sheet.

Digital storage of information: MET is able to store job specifications in digital form in a central system for about five years²², information which could otherwise be easily lost through mishandling of dockets. Multiple end-users who have been granted access by just a click of a button can view this information easily. This was not possible previously; employees had to wait until the docket got to them to know the specifications of a project.

Ease of tracing job history: Prior to the implementation of the *Hagen* system, this process used to be tedious and inefficient, as old jobs were easily lost or very difficult to track once they were completed. With the adoption of *Hagen*, clients' job history could be easily traced for reprints. This historical information includes job type(s), format, size, print run, substrates, purchase orders, time spent, and materials used by the various departments were saved in the system for a number of years. The shipping department was also relieved in the sense that it could build up a history of shipping data for customers and rely on such data for executing future jobs.

Increased information security: With the installation of the *Hagen* system, MET's employees needed to be granted access before entering data. Security of job information was thus much more guaranteed as compared to the earlier structure where unauthorized persons could easily make changes to the docket.

²² Anita Tuner, interview by Velma Larkai, Vancouver, B.C., July 7, 2014

Ease of generating invoices: Invoice generation used to be a difficult task; however, the introduction of the *Hagen* system at MET enabled the accounting department to feed on the job specifications, purchase orders, estimate and cost sheets data, and issue more accurate invoices without having to guess.

Better Workflow Organization: The tasks of planning and coordinating projects in each department were streamlined, as there was an improvement in coordination and workflow management. Planners could track the stage of a job and know what had been done and what had not been done. The shipping department could also trace shipments using the *Hagen* system. Project estimating became more accurate, and *Hagen* enabled estimators to generate quotes by just feeding the project's specifications into the system.

Reduction in time and resources: The adoption of the *Hagen* system led to a massive cut in time and wastage at MET. Staff used to spend lots of time searching for job dockets in the docket room, but with the implementation of the new software staff could view job specifications even before the handwritten job dockets got to them, saving time and resources by streamlining the production process.

Ability to monitor production information (time and material cost): The use of the *Hagen* system enabled the company to track the time and materials spent on each job, which could not have been done previously. Also, the tedious work that came with management of purchase orders was reduced and kept in check.

2.2.4 Challenges and Limitation

In spite of all these unique capabilities and positive effects the *Hagen* system had on MET's operations, the system presented some challenges that set the company back.

These limitations included:

Information entry limitations: Although *Hagen* was capable of storing information, it did not allow for the entry of all the detailed specifications of a job, including sub-trade types, imposition/ layout scheme, etc. This information had to be communicated verbally or in writing. Staff still had to rely on the circulating docket information for specific details, and only had access to it when the docket got to their department. Planners still had to manually co-ordinate sub-trades since this was not possible using *Hagen*. Time wastage, although reduced, was still a persistent challenge.

Difficult to edit content: Not only was it difficult to enter detailed information, but it was also difficult to make changes in *Hagen* since it did not allow data updates after a period of time. When there was a change in specifications, corrections were made directly on the hand job docket. Such corrections affected the workflow, which called for re-planning. Employees were unable to view updated dockets electronically, so planners communicated updates verbally. This task was very tedious and demanding. On occasions where planners were unable to communicate updates in a timely manner, there was great loss to the company, as jobs had to be reprinted due to wrong specifications. The other challenge had to do with difficulty in redrafting quotes based on different specifications, which had to be done manually.

Inaccurate data: Since time and materials used by employees were manually entered into *Hagen*, it was very difficult to monitor information accuracy. In some instances, employees forgot to input production information or entered incorrect information. As a consequence the accounting department encountered difficulty in preparing invoices for billing clients. This also made it difficult to accurately track the efficiency of the various departments. The rippling effect was that reports and job evaluation were incorrectly generated as a result of wrong information being entered into *Hagen*.

Low level of automation integration: The *Hagen* system was mainly used by the accounting, planning and estimating departments to complete daily tasks, in addition to its use as a database for employee submitted production information. Activities such as scheduling, press monitoring, layout impositioning, etc. had to be carried out separately or manually as *Hagen* did not support such activities. Generating a comprehensive report to measure the company's productivity was nearly impossible; management had to rely on individually generated reports that provided fragmented data.

2.2.5 Need for the Hagen MIS Upgrade

MET had witnessed great improvement in its operations as a result of the introduction of the *Hagen* MIS compared to the fragmented, manual system it had in place before. However, the challenges outlined above hampered its efficiency target of integrating 80%²³ of the workflow process. The company needed to increase its output and efficiency to remain competitive. The IT department needed better coordination

²³ Company's automation target after *Hagen* MIS implementation. Scott Grey, Interview by Velma Larkai, Vancouver BC, July 20.

between departments to be able to synchronize the workflow as one system.

Management needed real time accurate data that could be pulled up at any time, and to view staff and equipment (printing and binding) performance to make sound strategic business decisions.

As a whole, MET needed to cut down on waste and be more productive. It also needed an automatically-generated report system, which would reveal the exact state of the business, be it monthly, quarterly or annually. This led to MET's decision in 2013 to upgrade *Hagen* to *Monarch* MIS in order to tackle the deficiencies outlined above.

The next chapter examines the introduction of the upgraded MIS at MET. It describes the components and explains how the various modules work together to make the production workflow fully automated. It then presents the new workflow management and assesses the system's impact on MET's operations.

Chapter 3: Monarch Management Information System

3.1 Introduction and Implementation

Following a study of emerging trends and in consultation with MIS service providers, the company decided to upgrade the *Hagen* system and add more modules to improve the level of workflow automation²⁴. The updated *Hagen* software, *Foundation*, serves as the system's core. The additional modules added were *Portal* for sales, *Planner* for job planning and coordination, *PrintFlow* for scheduling, and *AutoCount* for printing press and bindery machine's performance tacking and monitoring. All these components together make up the new MIS, *Monarch*,²⁵ also from the EFI Company. *Monarch* was introduced to MET in 2013²⁶ and it is in use to date.

The IT head²⁷ took each department through demonstration and training sessions of the system's component that related to their daily task. The software developers were also called upon to provide specific training in areas that needed more assistance. Such training was very expensive to run.

²⁴ Mike Winteringham, interview by Velma Larkai, Vancouver, B.C., August 7, 2014

²⁵ Monarch is made up of *Foundation*, *Portal*, *Planner*, *PrintFlow* and *AutoCount* components.

²⁶ Scott Grey, interview by Velma Larkai, Vancouver, B.C., July 20, 2014

²⁷ Alex Neubauer, interview by Velma Larkai, Vancouver, B.C., July 30, 2014

3.2 Components of Monarch MIS

3.2.1 Foundation

As described earlier, *Hagen* has been replaced by *Foundation*, the core of the MIS, and has been upgraded to include the following features:

- estimating, planning and scheduling
- materials purchasing
- production data collection and costing
- accounting and billing
- prepress, press, post press/ bindery management
- inventory control
- shipping and order fulfillment
- report generation etc.

Foundation also serves as the central hub for the various modules, including *Portal*, *Planner* and *PrintFlow* and *AutoCount*, all of which link with and feed information directly to other modules as necessary. The data content in *Foundation* is accessible to anyone who has been granted permission to see it, and staff can log into a specific component for their daily work. *Foundation* also generates a live electronic job docket that provides all specifications once an employee enters the job number.

3.2.2 Portal

This module functions as a Customer Relationship Management (CRM) tool that enables sales representatives to communicate directly with clients and generate an accurate job description for the estimator to prepare a quote. It specifically enables sales representatives to collect, validate and deliver detailed project specifications.

Portal captures information such as the job title, job type, size, stock, ink and quoting,

finishing, packaging, notes for estimator, paper type, quantity, finishing type, printing, prepress, packaging, delivery date and other detailed information required for the workflow processes. *Portal* directly links the sales representatives with the workflow by feeding all the specifications into *Foundation* for estimators to pick and develop quotes. When a job is approved for production, planners set up jobs without re-keying the job specifications, as this is automatically fed into *Planner*. *Portal* also has special capabilities of converting customer-approved quotes into orders with just a click of a mouse. It also has special functions for custom cataloging, ad-hoc job submissions with validated specifications, Variable Data Printing (VDP) with online proofing, invoicing and credit card processing, job status and history viewing.

3.2.3 Planner

This module is mainly used by the planners and schedulers for setting up and planning jobs. It captures detailed information in various categories, namely:

Order entry: Job name, ship by date, promised date, estimate numbers, previous job number, the internal staff that will be working in the project (sales representative, planner, scheduler etc), production process and notes for the various departments.

Scheduling dates: Paper due, files in, proof out, proof approved, press start, bind start, ship complete, ship by and a promised delivery.

Specifications: Job type, forms, versions and quantity needed for each sample (sales, bulk, docket and billable).

Parts Inventory: Trim and untrimmed size (width and length), guide edge size, colours and number of pages for each form.

Process planning: Prepress plan for the various job sections and how each should be done, imposition and layout, press plan, paper assignment, press machine

assignment, colours, print run, bindery plan, what methods are to be used, and how the project will be completed.

Distribution: Types of distribution, customer pick up mailing services, mail, warehouse, the address for each type of delivery, and the quantity as stated.

Once all this information is entered into the *Planner*, the data is automatically synchronized with *Foundation* and *PrintFlow*. Employees at various departments are able to access the aspects of the job that apply to their daily tasks when they sign into *Foundation*. The scheduler also uses this information in to accurately schedule workflow tasks in *PrintFlow*.

3.2.4 PrintFlow

PrintFlow is a workflow management tool used by the scheduler to automatically schedule jobs for the production departments—repress, press and bindery²⁸.

PrintFlow feeds on the data from *Planner* and *Foundation*, the scheduler then breaks each job into production tasks. He assigns time to each task and sets up *Printflow* for scheduling. The scheduler determines available and non-available times, press and bindery downtimes, staffing restrictions, etc., and indicates how tasks should be prioritized—setting similar works up together to reduce switch-overs in the press and bindery. The scheduler also has the option to set up certain task times that should not be changed regardless of the program's settings and then allows the program to schedule jobs automatically.

²⁸Brian Beharrer, interview by Velma Larkai, Vancouver, B.C., July, 30

Each scheduled task shows up in *Foundation* for employees to view. *Printflow* also feeds *AutoCount* with scheduled tasks information for operators to know what is expected of them. Once tasks are completed, they are reported back to *PrintFlow* as *task complete*, and also updated in *Foundation*.

3.2.5 AutoCount

AutoCount is an automated production floor data collection program that provides live data about printing press and bindery machine performance. It works on a Direct Machine Interface (DMI) technology that connects printing press and bindery machines to *Foundation* and also provides the operator with two categories of data²⁹. The first is the electronic docket data, which provides live data of job specifications such as type of job, size, quantity, ink, number of versions and forms, quantity, shipping instructions, etc. This always keeps the operator updated with job specifications before running a particular job. It also shows the tasks assigned to the press and bindery machines, the job number, quantity, brief task description and the machine's operation sequence. The operator has to then select a task and run the press and bindery machines based on the specifications.

The second aspect of *AutoCount* is the operator's ability to view the status and performance of the press and bindery machines at every point in time. *AutoCount* has automatic sensors that detect when a printing press or bindery machine starts to run, its speed, how much time is needed to complete the job, and tells the system when a

²⁹ Serves Spiros, interview by Velma Larkai, Vancouver, B.C., July 29, 2014

task is complete. It also shows the number of impressions, waste and stop times for every job. Based on this data, the system updates the inventory and costing files, providing management with the information they need to make important price and process decisions. Management is also able to track the operators' performance since each operator has to be logged in to use the program.

3.3 New Workflow using the Monarch MIS

With *Monarch* in place, production workflow has become more automated and easier to manage at MET. A typical illustration of the *Monarch* MIS production workflow is as follows (Fig. 3):

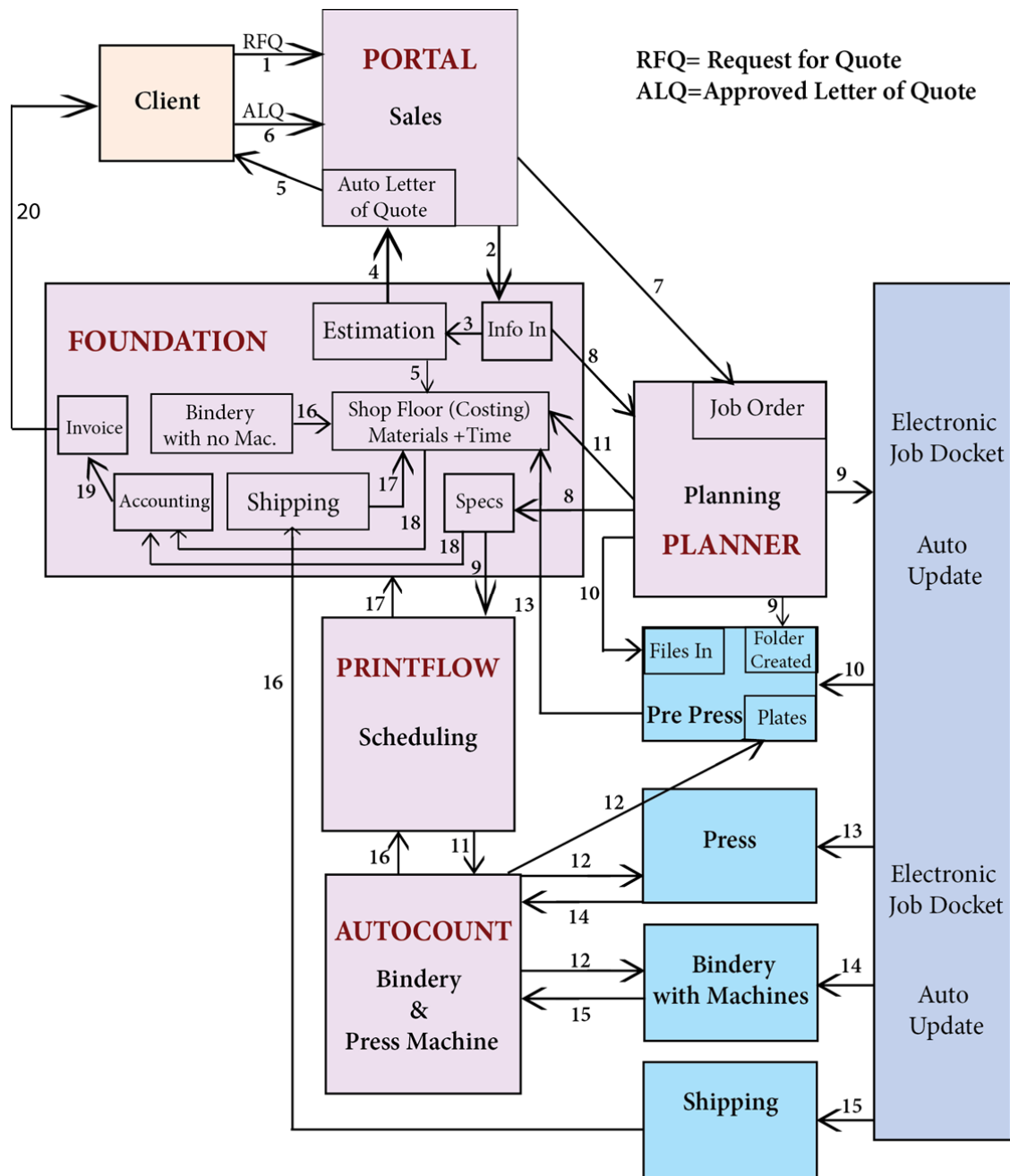


Fig. 3 Workflow chart describing the use of Monarch at MET. [Source: Velma Larkai, October 2014]. The numbers indicate sequence of steps in the production process.

The sales representatives receive a request for quote (RFQ) from the client, which highlights the project's specifications and enter the details of the specifications in *Portal*, which is automatically synchronized with *Foundation*. Estimators also build on this information in *Foundation* to prepare quotes for clients; they determine the workflow for each job will undergo and assign materials and labour cost to develop a job estimate. When this process is completed, a quote letter³⁰ is generated automatically with a corresponding estimate number. The sales representatives receive a signal in *Portal* and are able to retrieve, review, and email the letter to the clients for approval.

Once the quote is approved, the sales representatives send a copy of the quote letter through *Portal* to the planners to set up the job. This information is then synchronized into *Foundation*. Planners key-in the estimate number in *Planner* to extract the job specifications from *Foundation* and build on this data in *Planner* by adding more details to plan the job workflow, outlining how tasks should be carried out in prepress, press, bindery, shipping and for material purchase. When the job is fully planned, a special folder is automatically generated in *Foundation* and this is directly received in the EPP department. The folder highlights deadlines and the types of files to be received.

Back at the scheduling/planning department, planning data is also automatically sent to *PrintFlow* where the scheduler sets up task schedules for production based on the availability of printing presses and bindery machines, staff and cost centers.

³⁰ Letter that provides details of an estimate of jobs for clients. It outlines the cost of materials, time and labour to be invested to get a job completed.

PrintFlow automatically generates a Gantt chart, which schedules each task into a time frame. The main production schedule includes prepress, plate development, press and bindery work. Scheduled tasks are also automatically sent to *AutoCount* for press and post press machine operators to log into the system, to view the details of their task and begin to work. As the presses and bindery machines are run, *AutoCount* automatically collects performance data and sends information directly to *PrintFlow* and then to *Foundation*. Press and bindery operators that do not have *AutoCount* installed on their machines key-in their production data into *ShopFloor*, a component of *Foundation* that details time spent on each task for costing. When the bindery work is completed, the shipping department logs into *Foundation* to carry out shipping activities for delivery. To end the workflow process, the accounting department feeds on all production data from *Foundation* to develop billing invoice clients, also through the use of *Foundation*.

3.4 Impact of Monarch MIS on MET's Operations

The new workflow demonstrates the success of *Monarch's* management tools. The impact of *Monarch* on MET's activities can be put listed under four main categories:

Improved Workflow Automation: Workflow automation using *Monarch* grown from 25% to about 75%³¹. When a task is completed in one department, it automatically shows up at the next or other related departments for employees to complete their respective portions of the process. *Monarch* automatically delivers real-time run list production, updating and leveraging true dynamic schedules. It also automatically delivers data collection in real-time production intelligence, allowing employees to

³¹ Alex Neubauer, interview by Velma Larkai, Vancouver, B.C., July 30, 2014

easily view jobs in order and know the status and performance of each aspect of the operation.

Information System Integration: Another major impact *Monarch* has had on MET is granting employees the ability to pull data from more than one source. *Monarch* integrates all modules and functions as a powerful reservoir for storing information. It synchronizes and updates data linked to job characteristics, equipment, materials, operation, cost, etc, from all modules. Detailed job history can be easily tracked and referred to for assessment and new job planning. Management can now monitor operations in all departments as well as modules and build accurate reports for effective decision-making.

Good management of time and resources: The next major impact the system has had on MET's operations is a drastic reduction of time and resource consumption in the various departments. After a year of *Monarch's* implementation, there has been a reduction of non-chargeable material waste of about 30%³² in prepress, plate spoilage, press set-up time and materials due to fewer planning errors. Also, there has been an improvement in communication between sales, planning and production, streamlining the movement of jobs between departments and work centers. The automated capabilities of *Monarch* requires little in the way of manual operations, saving time and thus increasing capacity

³² Scot Grey, Interview by Velma Larkai, Vancouver, B.C., September 18, 2014

Efficiency and Accuracy: The level of accuracy in the workflow process has been outstanding, as automation eliminates lost, delayed and poorly communicated information. This provides a good basis for more accurate estimates and better job planning. There has been a higher degree of accuracy in the estimating and planning processes, leading to improved win-loss ratio, which has led to higher profit margins for MET. Planners can now accurately develop a job's layout as well as provide flexibility to efficiently address customer or production changes. Press operators have become more efficient; the equipment is consistently monitored and downtimes addressed in a timely manner. This has allowed management to respond more efficiently to process challenges and mechanical problems before they consume resources and profits.

The underlying outcome of these impacts on the company's operations can be summed up as increased job acquisition, more efficient workflow process and accountability, on time delivery, and increased output and productivity.

MET has made great strides in its operations, output and returns since the introduction of *Monarch*. However, this upgraded system has been a big change for the company and has led to a number of implementation challenges, which include staff reaction to the use of Monarch, level of integration, and challenges associated with using the system. These are the foci of the next chapter of this report.

Chapter 4: Operational Realities of Monarch

4.1 Level of Integration

After a year and half of the MIS upgrade, MET has significantly improved its workflow management. It has been able to integrate *Monarch* into the whole production workflow leaving very few tasks that require manual operations.

The result of a mini survey³³ which included forty-three employees to ascertain their experience with the *Monarch* MIS showed that eight have access to *Portal*, eight to *AutoCount*, three to *PrintFlow*, eight to *Planner*, and forty-one to *Foundation*. Of this number, 49% of the staff complete all of their daily tasks using at least one of the *Monarch* modules, while 40% complete part of their daily tasks using the MIS. Of the employees surveyed 11% rarely use the system to complete their tasks, but rather rely on other software, or carry out their daily tasks manually. This result showed a high level of employee engagement with the *Monarch* system, MET's great achievement.

In examining the level of MIS integration on a departmental level as provided by the IT Head³⁴, the sales department has achieved 50% MIS integration through the use of *Portal*. The other 50% could be related to the use of additional Customer Relationship Software (CRS) and emails to complete their sales functions. MIS integration in the planning department has achieved to 95%. Planners use both the *Foundation* and

³³ This survey became necessary after interacting with MET staff to find out their level of access, experience, expectations and reactions to the *Monarch* MIS since its introduction. It involved the use of semi structured questionnaires conducted by Velma Larkai, Vancouver BC, July 31 2014.

³⁴ Interview with Alex Neubauer: Assessment of *Monarch* MIS integration after a year and half of implementation, Velma Larkai, Vancouver BC, July 24 2014.

Planner module in completing their daily tasks. The other 5% is related to the use of emails for internal and external communication between clients and other employees. The scheduler operates semi-automatically in *PrintFlow*, with an integration level of 70%. Task schedules are generated through the supplementary use of the scheduling board and an Excel sheet. This will soon change to 100% integration after the implementation of external software training³⁵ held in August 2014.

Estimators complete 95% of their tasks using *Foundation* and the remaining 5% can be attributed to the use of emails. The level of integration in the EPP department remains at just 25%, mainly in the use of *Foundation* for layout preparation and logging in and out of jobs. This is because the *Adobe Creative Suite* and *Preps*, a prepress software for managing print files, are the main software used by the EPP.

At the press and bindery department, the company has been able to achieve 100% integration for five out of the twelve press and bindery machines that have the *AutoCount* module installed. Operators of the other seven machines and the hand bindery workers log in and out of jobs using *Foundation*. The level of integration is about 50%, as most of the bindery tasks are done manually.

Shipping has 30% of its tasks completed through the use of *Foundation*. Its operations are mainly supported through the use of other shipping software provided by shipping companies such as FedEx and the United Parcel Service (UPS) to arrange shipping

³⁵ EFI Monarch representative carried out a one-week external training with the Prepress, Planning and Scheduling Department. This took place from July 21-24, 2014. The Author (Velma Larkai) was part of the training program.

consignments for both purchases and delivery. Accounting completes 90% of its task using *Foundation* for billing, invoicing, etc.

As a whole, MET has been able to achieve 75% MIS integration level in its production workflow and this is a good development, although difficult, in terms of attempting to meet its target of 80%. Simple jobs are fully run using only electronic dockets generated in *Foundation*, but complex jobs are run using both electronic and PDF-based hand dockets.

4.2 Challenges with Implementation and Full Adoption

In spite of the high level of integration and profitability that MET has been able to achieve following the introduction of *Monarch*, the company continues to face several implementation challenges relating to employee interest and full adoption, which inhibit the company from achieving full MIS automation. While some employees conformed to the new workflow system, others made the implementation process difficult. Two major reasons could be attributed to this challenge, namely:

Slow Acceptance to Change: Employees' slow acceptance to change remains the major stumbling block for full adoption of the *Monarch* system by MET. This is not surprising since adapting to change is identified in the literature as one of the major organizational challenges.³⁶ According to Todd (2002), there are four stages of change. At the first stage, employees reject the idea of change; they believe change is neither possible nor necessary, often as an excuse for hiding their unwillingness to

³⁶ Todd D. Jick, "Managing Change," pp366

learn or take up new challenges. The second stage is where employees get defensive and resist efforts directed towards change; they are more reactive rather than sensitive to the company's overall goals. At the third stage, they become less averse to change, show signs of curiosity, and begin to explore new systems to know what they have to offer. The final stage is acceptance and adaptation on the part of employees, at which point they have satisfied their curiosity, accept the benefits of the change, and finally give in to change.

An analysis of the above-mentioned survey³⁷ and interaction with employees show that 5% of MET's employees could be classified as being in stage one of the change process—these people have not come to terms with the benefits of the Monarch system and prefer to using the old familiar methods. Another 15% could be categorized under stage two, as they think the system is time consuming. They have expressed experiencing difficulty in having to pull through to work with the *Hagen* system and the demanding nature of having to learn a new system. “*Monarch* is just too time consuming and stressful”, said one staff member.³⁸ This was the main response given by a number of employees who were struggling with the new system. 54% are in the third stage of the system's explorations as these have encountered various challenges but make conscious efforts to improve upon their use of the system. The remaining 26% have come to a full acceptance of the system and have been encouraging their colleagues to fully embrace it. Overall, about 74%, representing more than half of employees, remain in the first three stages of change and possess as a major hurdle for

³⁷ Internal survey, carried through assisted questionnaires on forty-three MET employees to ascertain their view of the company's MIS, Velma Larkai, Vancouver BC, July 31 2014

³⁸ Interview, Velma Larkai, Vancouver BC, July 16 2014.

MET. This is in spite of the current project, Continuous Improvement (CI),³⁹ set up to enhance employee's MIS adoption, showing that the company needs to do more to positively influence the attitude of employees.

Employee's Interaction with Monarch: The second impediment to realizing *Monarch's* full potential is employee's interaction with the system. This is where staff either enter information incorrectly or do not enter the required data into *Monarch*. As a result, the entire workflow is sometimes affected and when this is identified at a later stage, it causes logistical problems especially to scheduling and costing activities. There are also issues with consistency in data entry by employees of the same department. This is because some employees do not follow the exact procedures in getting their tasks completed, thereby causing delays in interpretation and analysis of data.

4.3 Employees' Experience

The introduction of *Monarch* at MET has been a major cause of concern among both management and employees that has led to several heated discussions over the past year and half. There have been mixed reactions, ranging from system acceptance to rejection, conformity, etc. In the light of the company's aim to achieve full MIS integration, employees play a major role in realizing such goal.

³⁹ CI project is a program where by employees are given the opportunity to develop themselves on a gradual assessment level established in 2013

In rating employee's preference of the *Monarch* system based on the results of the internal survey,⁴⁰ 38% indicated that they like the system and find it to meet their expectations. On the other hand, 14% said they do not like to use the system since it does not meet their expectations. The other 48% seemed indifferent to the system's performance.

Although a great percentage like or are indifferent to the *Monarch* systems, employees have varied experience in relation to its use. 26% find the system simple and are comfortable with the features of the modules, while 13% feel that the system is too complicated and has too many features. In contrast, 14% of employees think that the system does not have enough features to enable them to complete their tasks at one go, as they have to rely on other software for their daily operations. Another 7% do not fully understand how the system works, since they struggle so much in getting their daily tasks completed in *Monarch*. Again, 7% do not know the purpose of the system; they have not come to a realization of what the system has to offer.

A significant 15% prefer to use other programs that offer more flexibility and allow them to work better. Also, 8% do not see any results when they use the system and this presupposes that the system does not have much to offer to them. "The program is tech savvy and I am not a computer person", said one employee. This was the view of another 8% who prefer working with non-computerized systems. 2% believe that the system is time consuming and prefer using the old workflow method. These

⁴⁰ Internal survey, carried through assisted questionnaires on forty-three MET employees to ascertain their view of the company's MIS, Velma Larkai, Vancouver BC, July 31 2014

percentages reveal employees' concerns that are affecting the full adoption of the *Monarch* system and need to be addressed by management.

In seeking suggestions on how employees' usage of *Monarch* could be improved to achieve complete MIS workflow acceptance, within the plant, 31% requested to have more training to fully understand the operations as a way of providing encouragement to them to use *Monarch* to its full potential and appreciate its abilities. A further 38% said they needed to know how the use of *Monarch* affects the workflow chain.

Although they make a conscious effort to execute their daily tasks, they indicated their desire to understand the workflow chain and how their actions or inactions relate to, or affect, other departments. The last category constituted of 31% of the company's employees, wanted to see more results from the use of *Monarch*. They want to be able to monitor and analyze their output. By so doing, they could easily assess their performance or that of the company and know which areas are lacking and make improvements.

Again, these suggestions give a clear indication of the areas MET is lacking, including employees' unmet needs. To achieve complete MIS integration, MET's management should start by addressing these issues that are of major concern to staff.

4.4 Limitations of the Monarch System

So far, the *Monarch* MIS has proved to be more efficient and has resolved a high number of the company's challenges. That notwithstanding, employees experience some glitches as they operate the system. Below are the lagging areas, identified by the employees in their operation of the *Monarch* system.

According to the sales representatives, *Portal* is not fully compatible with other CRM software, as they have to constantly log in and out of both systems to organize job data and communicate with clients. The shipping department faces a similar problem where *Foundation* is not compatible with other shipping software; this leads to double work when information has to be entered into other programs and run separately from *Monarch*. The situation creates errors and lapses between the company and other shipping firms or clients. The planners have trouble with developing imposition for jobs since that aspect of *Planner* is "just too complicated and technical", as one planner described. Layouts are mostly transferred to the IT department for development, and this causes several delays when that department is burdened with many diverse tasks.

To the scheduler, *PrintFlow* does not give room for comments or personalized information. Schedulers have to keep a separate record of tasks that need personalized information on a separate document, which is not directly linked to the system. Such information could easily be lost or forgotten when developing schedules or communicating with other staff. At the prepress department, the system does not provide enough features to enable them carry out their daily tasks of design,

retouching and proofing. They feel *Monarch* does not meet their needs and prefer not using it.

The accounting department sometimes experiences difficulty in retrieving information for costing and billing which makes accounting tasks cumbersome. All other departments do not have major problems, but wish the system was more intuitive and flexible. This was reflected in the survey, where more than half of the employees (59%⁴¹), wished *Monarch* had other features that would make it more effective to use, in addition to the remarkable improvements and transformation it has already brought to the company.

⁴¹ Internal survey, carried through assisted questionnaires on forty-three MET employees to ascertain their view of the company's MIS, Velma Larkai, Vancouver BC, July 31 2014

Chapter 5: Conclusion

5.1 Overview

The use of MIS to enhance print workflow management has gained currency in the print industry in recent years. This report has given an account of the introduction of MIS including, the opportunities and challenges associated with it, at MET—a leading North American print firm based in Vancouver.

The first phase entailed the introduction of *Hagen* MIS in 2002 to replace the manual recording and tedious management of projects and production process that the company was previously using. This adoption was a giant leap for the company.

Hagen, which served as a central system for storing and retrieving job information right from acquisition to delivery, enhanced MET's operation in a number of ways. These included: the ability to digitally store job specifications and trace job history, increased information security, the ability to monitor and keep track of production information for generating invoices for client billings, more organized and streamlined workflow process and better management of time and resources as a whole, and a greater degree of organization and streamlining in the workflow process.

MET was able to achieve 25% workflow automation through *Hagen*. In spite of all these capabilities and positive effects that *Hagen* brought, the system was fraught with several challenges—namely restrictions on the amount of information entry, the inability to edit data, a low level of automation integration and inaccurate data entry—that held the company back in many ways.

After a decade of use, MET decided to upgrade *Hagen* MIS to a more advanced system that would overcome the limitations of the former and increase the company's productivity and efficiency. The advance MIS, *Monarch*, is comprised of the upgraded *Hagen* software, now known as *Foundation*, integrated with four other modules to make the production process fully automated. *Foundation* mainly serves as the central hub that links the other four modules which perform specialized functions: *Portal* for sales coordination, *Planner* for job planning and coordination, *PrintFlow* for task scheduling, and *AutoCount* for monitoring machine's performance.

After almost two years of *Monarch's* implementation, MET has achieved a 75% level of tasks completion using MIS. Although this high level of integration could be rated a success, the company faces a number of setbacks linked to staff hesitance to fully embrace the *Monarch* system.

This situation persists in spite of management's effort to improve upon employees' usage of *Monarch*. In a survey conducted as part of the study, a total of 86% of MET staff ranked their experience as average and another 74% expressed concerns with the system that needed to be addressed. Some of the limitations pointed out by employees are *Monarch's* incompatibility with some CRM and shipping software, difficulty in developing layouts, and the system's general unintuitive nature, among others. These lagging areas, if addressed, will improve upon *Monarch's* transformational capabilities of providing complete workflow automation to print companies.

5.2 Future Goals and Recommendations

The introduction and full implementation of the *Monarch* MIS has been a dynamic experience for MET. To harness the full potential of *Monarch* and further enhance its operations, management has outlined a number of goals it intends to focus on in the coming years. These goals⁴² are to:

- keep the technology current through constant updates and build on add-ons.
- get everybody on board, muscle through the difficult times and be more patient with some people and less patient with others. This will serve as a motivation to promote a positive attitude from employees.
- apply the ‘automate, stop, check’ rule⁴³ to prevent the lapses that come with relying solely on full automation technology.
- integrate *Monarch* with the company’s storefront, MET Resource, and combine it with customer service.

In addition to those goals, the following goals are for MET’s consideration to enhance its use of MIS. Management needs to:

- conduct more internal and external training sessions to give employees a holistic view of the *Monarch* MIS including an understanding of the various interdepartmental linkages and how the efficiencies and inefficiencies of each task affects the entire production workflow.
- intensify efforts to ensure employees keep up with continuous improvement.
- carefully monitor staff interaction with the system, by carrying out constant checks and maintaining a critical eye, to minimize company losses.

⁴² Direct interview quotes from Management, Velma Larkai, Vancouver B.C., August 7, 2014.

⁴³ Constant manual checks to prevent work flow errors

- have more defined parameters for uniform output to prevent inconsistencies in data entry and *Monarch's* system operation.
- have one central output area to project production reports so that everybody can see the system's impact, happening on a live data.
- constantly update employees of new company developments to enable employees gain a full picture and understanding of company's goals so they can better accept change and adhere to management's procedures.
- relay limitations of the *Monarch* system to software developers to assist them in developing software and system updates.
- carry out periodical internal company studies which addresses company's lagging areas and staff concerns to enhance rapid response and improvement on *Monarch's* performance.
- liaise with software developers to come up with a customized MIS that suits the needs of the company—long term plans.

In conclusion, this study has provided an insight into the use of MIS and its impact in the print industry. It is clear that MET has taken a bold step to adapt to this venture, which has been beneficial to the company in terms of productivity and profitability. Like most other companies, aversion to change has been the biggest challenge to MET's ability to fully realize the potential of MIS. However, with determination, and critical response to employees' needs, the company is sure to achieve its desired MIS integration and output in no time.

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Survey on Employee's view of the company's MIS, assisted questionnaire conducted by Velma Larkai, Vancouver B.C., July 31, 2014

Appendix A: Questionnaire

EMPLOYEE'S VIEW OF THE MONARCH SYSTEM

This questionnaire is to enhance my study of Print Automation in the Company.

Please fill out the spaces and select as many options that fit your description.

1. Department _____
2. Which module of *Monarch* do you use?
 - a. Portal
 - b. Auto Count
 - c. Print Flow
 - d. Planner
 - e. Foundation, which aspect? _____
3. What percentage of it has a direct link with your daily task? _____
4. How often do you use it? a. For every tasks b. For some tasks c. Rarely
5. Do you like it? a. Yes b. No c. Indifferent d. Other _____
6. How would you describe your experience with it?
 - a. It is comfortable to use
 - b. It is too complicated to manage
 - c. It does not have enough features to enable me complete tasks at one go
 - d. I do not understand how it works
 - e. I do not know it's purpose
 - f. I prefer to use other programs
 - g. I do not see any results when I use it
 - h. The program is tech savvy, I am not a computer person
 - i. I love the old way and that is faster to me
 - j. Other _____

7. Do you wish it had other features or changes in the program that will make it more effective to use. a. No b. Yes
-

8. To assist me in making recommendations to management, how can your usage of the Monarch system be improved so as to achieve a complete automation of workflow within the plant?

- a. Need more training
- b. Need to know how my usage of the program affects the workflow chain
- c. Need to see more results
- d. Other_____

Thank you for your time and assistance, I really appreciate it.

Appendix B: Summary of Survey Data

1. Employee's access to Monarch

Portal	8
Auto count	8
Print Flow	3
Planner	10
Foundation	41

2. Percentage of Monarch's use that has direct link with employees daily task (Average percentage as provided by employees)

Sales	50%
Planning	95%
Scheduling	70%
Estimating	95%
Pre press	25%
Press/Bindery	100% for machines with AutoCount 50% for machine without AutoCount
Shipping	30%
Accounting	90%

3. Frequency of Monarch's use

For every task	21	49%
For some task	17	40%
Rarely/Not used	4	11%

4. Employee's Preference

Like it	16	38%
Do not like it	6	14%
Indifferent	21	48%

5. Employee's experience

Comfortable to use	16	26%
Complicated to manage	8	13%
Does not have enough features	9	14%
Difficult to understand its operation	4	7%
Do not know it's purpose	4	7%
Prefer to use other programs	9	15%
Do not see any results when used	5	8%
Tech savvy	5	8%
Love the old way	1	2%

6. Wish Monarch had more features to make its use more effective

Yes	24	59%
No	17	41%

Two employees did not answer

7. Needs of Employees

More training on Monarch's operation	13	31%
Understanding of how employee's usage affects the workflow chain	16	38%
See more results from the use of Monarch	13	31%

One employee did not answer.