

# CMMS Systems

The logo for Black & McDonald, featuring the company name in white text on a black rectangular background, with a red horizontal bar below it.A yellow starburst graphic containing text.

*B&M has significant knowledge and experience in the development, implementation and administration of CMMS systems.*

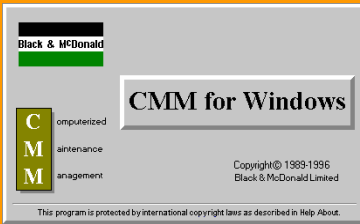
## Introduction

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At the forefront of Black & McDonald's operations are our proven processes and systems. This includes computerized maintenance management systems (CMMS). These systems serve as the foundation for many of our facility management and service operations, providing accurate database manipulation of electrical and mechanical systems, equipment specifications files, equipment history files, preventive maintenance schedules, repair work orders, subcontractor work orders and inventory control.

B&M has significant experience in the implementation and administration of CMMS solutions. This is supported by the successful implementation of CMMS applications in over 50 of our project sites, including Terminal 3 in Toronto, LFCA Meaford (a military training base), the Canadian Museum of Civilization in Hull, Quebec and commercial facilities such as the North American Centre and First Canadian Place in Toronto.

Our in-depth knowledge of CMMS applications lies not only in the support and implementation of these systems, but also in their development. In 1982, B&M developers designed our own CMM software, *Computerized Maintenance Management (CMM)*. This software has been continually developed and upgraded since that time, as new and better technology is developed and incorporated into the system.



We have actively implemented several different solutions meeting the needs and expectations of our client base. This has included the selection and implementation of such systems as:

- MAXIMO** • *Maximo* – Our current application of choice, B&M has undertaken the implementation of the Maximo software solution at various locations – most recently at the Canadian Museum of Civilization.

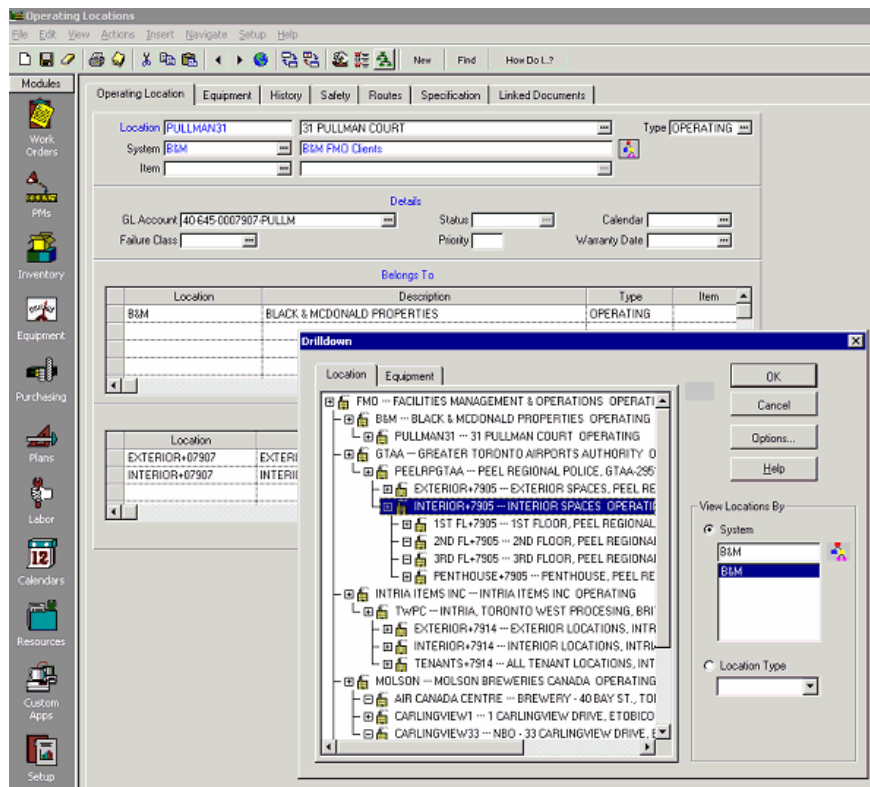


- CMM Software by Black & McDonald Limited** – As a developer of our own software solution B&M has implemented the CMM Software in various call centre-based maintenance environments, including Terminal 3 and LFCA TC Meaford. In addition, we have implemented this solution in numerous other major facilities across Canada, including multi-location facilities such as the Metro Separate School Board and Air Canada.

B&M operations & maintenance personnel support their activities by inputting selected data on-line for maintenance work requests. B&M works closely with the client toward developing required maintenance schedules for the facility, training the maintenance staff in the correct operation of the software, and working with the client to fully implement the system. This enables the client to effectively monitor and track the progress of our on-site staff.

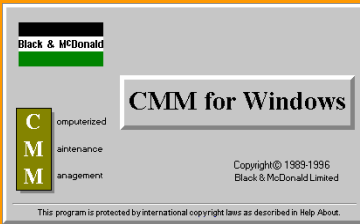
## CMMS Overview

Black & McDonald's CMMS provides for detailed strategic asset management and control.

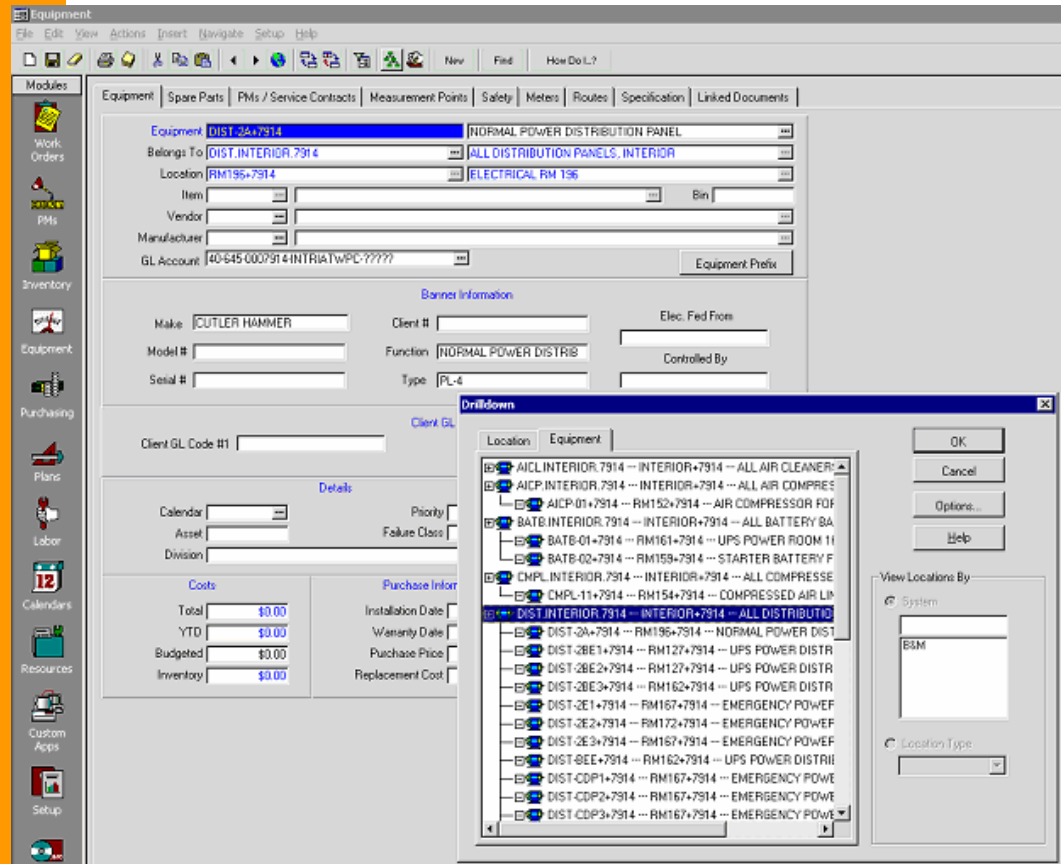


The CMMS manages all Operating Locations in a drill down hierarchy for easy locating of each facility. The physical relationship of the equipment within a facility, to the facility within its' geographic location or other hierarchy can be easily visualized.

Equipment assets and their attributes are easily managed via the equipment module which maintains such information as: Equipment location, function, make, model, serial, electrical fed from path, warranty dates, installation dates, etc to name just a few. Client facility asset numbers can easily be cross referenced against the database and reports to the client based upon specific general ledger codes can be accomplished. Asset maintenance histories, ytd costs and other specific asset information is readily accessible and can be reported or analyzed via the adhoc reporting



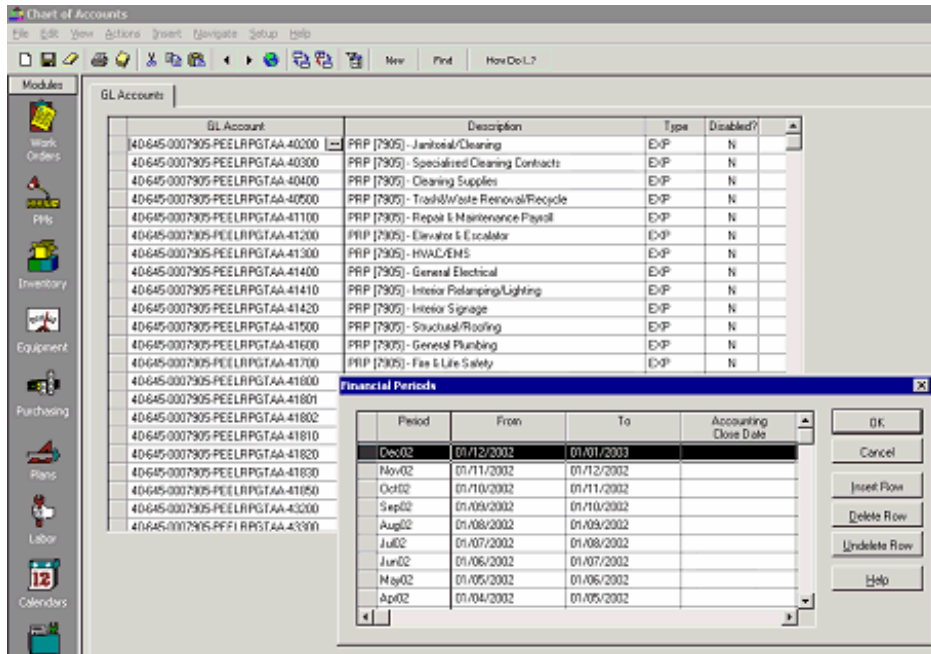
tools. The database is fully ODBC compliant and access to client data can be made available.



Standard equipment types allow for average maintenance cost comparisons and is valuable for exception or top N reporting analysis. Standard equipment types allow for easy set up of maintenance schedules as over 300 pre-defined maintenance tasks are maintained within the CMMS, grouped by equipment type and expected frequency.

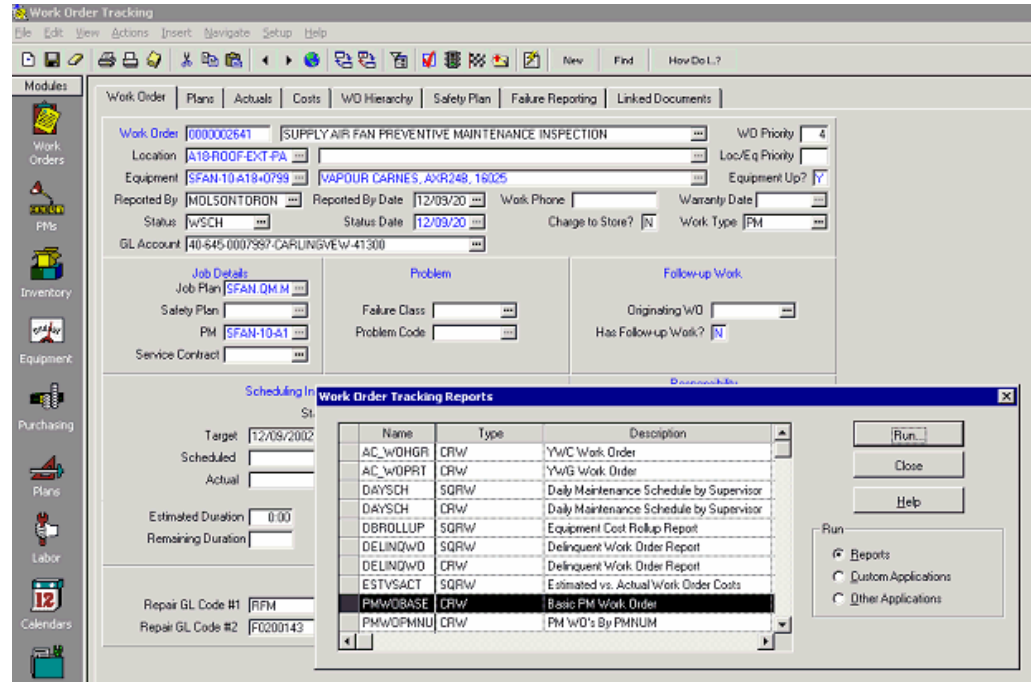
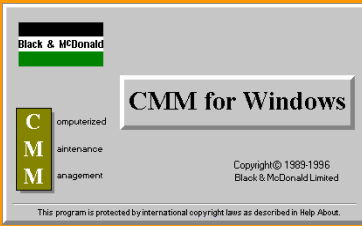
Each cost occurrence within a facility is tracked via a general ledger code for later reporting and analysis. Reports can compare budgets within facilities, across facilities and across regions or portfolios. Standard reports detail the labour, material and sub-contract cost components of each facility and are linked back to each physical asset for detailed asset accounting. Committed cost reports, detailed labour reports,

audit reports, etc are all output of the data entry process and provide accountability for all costs against each asset or facility.

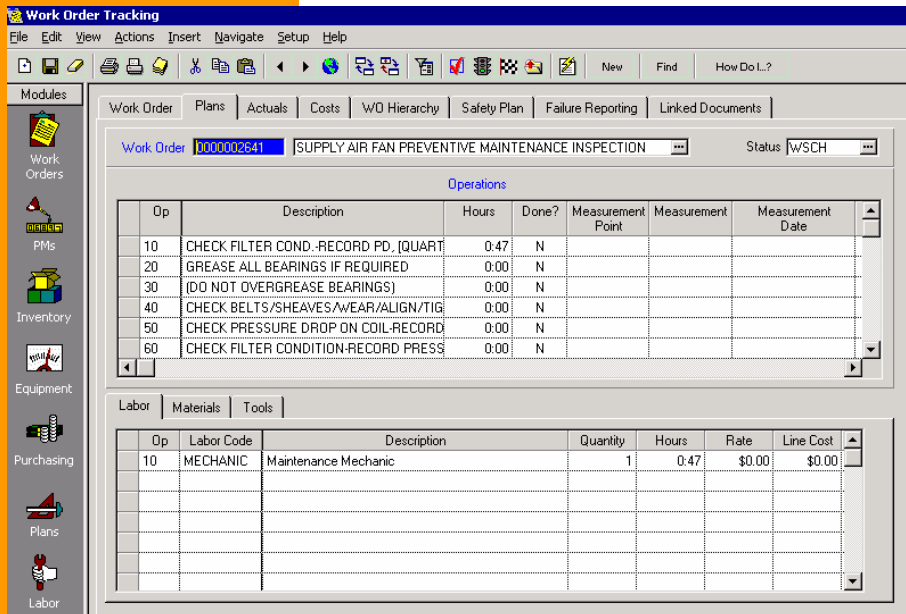


Cost are tracked against pre-defined general ledger accounts and fiscal periods.

All work orders created within the CMMS must be charged to a valid Location Code (facility point) or asset number (equipment) providing the highest level of strategic asset management.



Preventative and Demand work orders can be planned ahead of time and detailed work order activities are provided to the technician.



Detailed PM work orders provide for consistent deliver of work and allow for comparisons across facilities. Consistent deliver of work ensures all equipment across all facilities is maintained at the same pre-determined levels.

# CMMS Systems

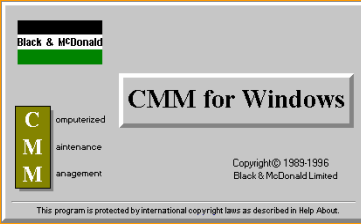
**Black & McDonald**

Annual maintenance plans and schedules ensure maintenance routines are up to date and can be altered to reflect changes in equipment, environment or operating conditions.

2002

92727																		
LOCATION	DEPARTMENT ID AND JOB PLAN	PRT.	FREQUENCY	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec			
BOILER 8M49272P	AJC P-49272P	AJC PAR 002	3.00	MONTH														
BOILER 8M49272P	AJC P-49272P	AJC PAR 001	1.00	MONTH														
BOILER 8M49272P	AJC P-49272P	AJC OR 001	0.01	MONTH														
BOILER 8M49272P	AJC P-49272P	AJC OR 001	0.01	MONTH														
BOILER 8M49272P	SLIP-149272P	SLIP AM 002	1.00	MONTH														
BOILER 8M49272P	SLIP-149272P	SLIP AM 002	1.00	MONTH														
BOILER 8M49272P	SLIP-149272P	SLIP AM 002	1.00	MONTH														
BOILER 8M49272P	SLIP-149272P	SLIP AM 002	1.00	MONTH														
MECH 8M49272P	COMB-1549272P	IFAC OR 001	0.00	MONTH														
MECH 8M49272P	COMB-1549272P	IFAC OR 001	0.00	MONTH														
MECH 8M49272P	DFW-149272P	DFHAR 001	0.00	MONTH														
MECH 8M49272P	DFW-149272P	DFHGR 002	0.00	MONTH														
MECH 8M49272P	DFW-149272P	DFHGR 001	0.00	MONTH														
MECH 8M49272P	DFW-149272P	DFHGR 002	0.00	MONTH														
MECH 8M49272P	DFW-149272P	DFHGR 001	0.00	MONTH														
MECH 8M49272P	DFW-149272P	DFHGR 002	0.00	MONTH														
HIGH BOILER 8M49272P	EEF-249272P	EEF OR 001	0.75	MONTH														
HIGH BOILER 8M49272P	EEF-249272P	EEF OR 001	0.75	MONTH														
HIGH BOILER 8M49272P	EEF-249272P	EEF OR 001	0.75	MONTH														
LOW BOILER 8M49272P	GEN-3149272P	GEN AR 234	1.00	WEEK														
LOW BOILER 8M49272P	GEN-3149272P	GEN MW 201	3.00	WEEK														
LOW BOILER 8M49272P	GEN-3149272P	GEN GA 201	2.00	WEEK														
LOW BOILER 8M49272P	GEN-3149272P	GEN MW 201	0.75	WEEK														
MECH 8M49272P	HUMD-2849272P	HUMD PRM 201	0.00	MONTH														
MECH 8M49272P	HUMD-2849272P	HUMD PRM 201	0.00	MONTH														
BOILER 8M49272P	HWYS-1149272P	HWYS AR 201	0.00	YEAR														
BOILER 8M49272P	HWYS-1149272P	HWYS AR 201	0.00	YEAR														
MECH 8M49272P	RACD-1549272P	STPLAM 002	4.00	MONTH														

Date Printed: 10/16/02
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**Work Order**

Printed: 15-Oct-02

04009230 EXHAUST FAN PREVENTIVE MAINTENANCE INSPECTION

Equipment #: EXH12-005-07397	Description: VAPOR CARRIER UNIT, COND
Name: VAPOR CARRIER	Room: 2730
Location ID: 005-BOGE-EXT-DRUMCABLE	Serial Number: 12888
Job Plan ID: EXHFQM.M04	Description: CHECK AND CLEAN FAN BELTS, SHEAVES (QUARTERLY MRP)
Start Date: 16-Aug-02	Status: WFRM
Finish Date: 20-Aug-02	GL Code: 40-045-000007-CARLMOYER+1300
Report Date: 20-Aug-02	Budget Code (if necessary):

Craft / Labour	Rate	Hours	Number
MECHANIC			1

Operation	Incomplete	Complete
10 CHECK AND CLEAN FAN BELTS & SHEAVES, (QUARTERLY MRP)	<input type="checkbox"/>	<input type="checkbox"/>
20 CHECK CAGE, SCREEN & LOUVER FOR OBSTRUCTION	<input type="checkbox"/>	<input type="checkbox"/>
30 CHECK & CLEAN FAN BELTS, SHEAVES & MOTOR	<input type="checkbox"/>	<input type="checkbox"/>
40 CHECK FOR PROPER DAMPER OPERATION & LUBRICATE AS REQD	<input type="checkbox"/>	<input type="checkbox"/>
50 LUBRICATE MOTOR IF REQUIRED	<input type="checkbox"/>	<input type="checkbox"/>
60 CHECK STARTER CONDITION (CONTACT FITTING)	<input type="checkbox"/>	<input type="checkbox"/>

COMMENTS / RECOMMENDATIONS:

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Employee ID: _____	Work Date: _____	Hour: _____	GL Code: _____
Employee ID: _____	Work Date: _____	Hour: _____	GL Code: _____
Signature: _____	Completed? <input type="checkbox"/>	Yes/No	

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Detailed Preventative Maintenance Work Order

Detailed Preventative Maintenance Work Orders ensure consistency in work delivery.

Cost control for a facility is provided via labour, inventory and purchase order tracking. All costs associated with managing the asset are accounted for. Detailed budget reports are readily available and up to date. Audit reports for all budget transactions are also available.



**Budget Cost by Expense Type for the Period: 01-Feb-2002 to 30-Jun-2002**

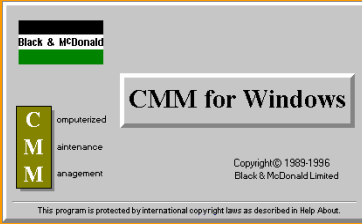
		2002/02	2002/03	2002/04	2002/05	2002/06	Total
50-650-000000-TEST COMPNY-41300	Labour	0.00	0.00	68.96	0.00	0.00	68.96
	Material	0.00	0.00	1.00	0.00	0.00	1.00
	<b>Total</b>	<b>\$ 0.00</b>	<b>\$ 0.00</b>	<b>\$ 69.96</b>	<b>\$ 0.00</b>	<b>\$ 0.00</b>	<b>\$ 69.96</b>
50-650-0092729-CABUILDING-41100	Labour	0.00	41.42	303.49	139.89	212.89	697.69
	Subcontractor	0.00	96.64	509.86	0.00	365.00	971.50
	<b>Total</b>	<b>\$ 0.00</b>	<b>\$ 138.06</b>	<b>\$ 813.35</b>	<b>\$ 139.89</b>	<b>\$ 577.89</b>	<b>\$ 1,669.19</b>
50-650-0092729-CABUILDING-41200	Labour	0.00	0.00	0.00	41.42	0.00	41.42
	Subcontractor	0.00	216.30	0.00	0.00	0.00	216.30
	<b>Total</b>	<b>\$ 0.00</b>	<b>\$ 216.30</b>	<b>\$ 0.00</b>	<b>\$ 41.42</b>	<b>\$ 0.00</b>	<b>\$ 257.72</b>
50-650-0092729-CABUILDING-41300	Labour	0.00	0.00	0.00	62.13	0.00	62.13
	Subcontractor	0.00	112.19	0.00	1,381.83	1,961.74	3,455.76
	<b>Total</b>	<b>\$ 0.00</b>	<b>\$ 112.19</b>	<b>\$ 0.00</b>	<b>\$ 1,443.96</b>	<b>\$ 1,961.74</b>	<b>\$ 3,517.89</b>
50-650-0092729-CABUILDING-41400	Labour	0.00	0.00	18.90	0.00	0.00	18.90
	Subcontractor	0.00	526.68	75.56	77.55	75.56	765.35
	<b>Total</b>	<b>\$ 0.00</b>	<b>\$ 526.68</b>	<b>\$ 94.46</b>	<b>\$ 77.55</b>	<b>\$ 75.56</b>	<b>\$ 742.25</b>
50-650-0092729-CABUILDING-41600	Labour	0.00	21.05	20.17	146.37	187.63	375.22
	Subcontractor	0.00	78.11	0.00	0.00	341.00	419.11
	<b>Total</b>	<b>\$ 0.00</b>	<b>\$ 99.16</b>	<b>\$ 20.17</b>	<b>\$ 146.37</b>	<b>\$ 528.63</b>	<b>\$ 794.33</b>
50-650-0092729-CABUILDING-43300	Labour	0.00	20.71	9.45	0.00	0.00	30.16
	<b>Total</b>	<b>\$ 0.00</b>	<b>\$ 20.71</b>	<b>\$ 9.45</b>	<b>\$ 0.00</b>	<b>\$ 0.00</b>	<b>\$ 30.16</b>
	50-650-0092729-CABUILDING-43400	Labour	0.00	62.13	227.87	258.20	188.58
Material		0.00	0.00	0.00	966.50	850.00	1,816.50
<b>Total</b>		<b>\$ 0.00</b>	<b>\$ 62.13</b>	<b>\$ 227.87</b>	<b>\$ 1,224.70</b>	<b>\$ 1,038.58</b>	<b>\$ 2,553.28</b>
50-650-0092730-COMMIYYCAC-40200	Subcontractor	0.00	1,400.00	1,469.22	1,400.00	1,493.18	5,762.40
	<b>Total</b>	<b>\$ 0.00</b>	<b>\$ 1,400.00</b>	<b>\$ 1,469.22</b>	<b>\$ 1,400.00</b>	<b>\$ 1,493.18</b>	<b>\$ 5,762.40</b>

**Detailed Budget Reports**

**Cost of Labour, Materials & Services Received for the Period: 01-Jul-2002 to 31-Jul-2002**

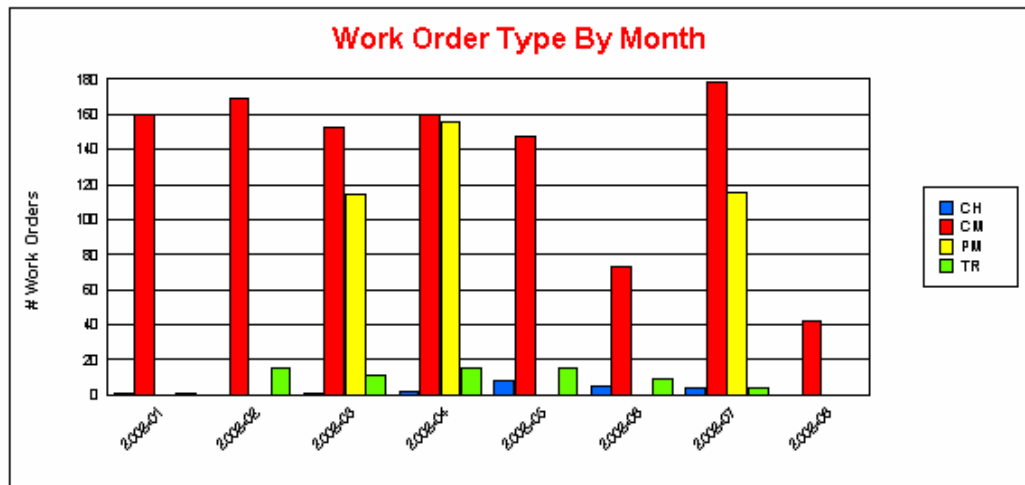
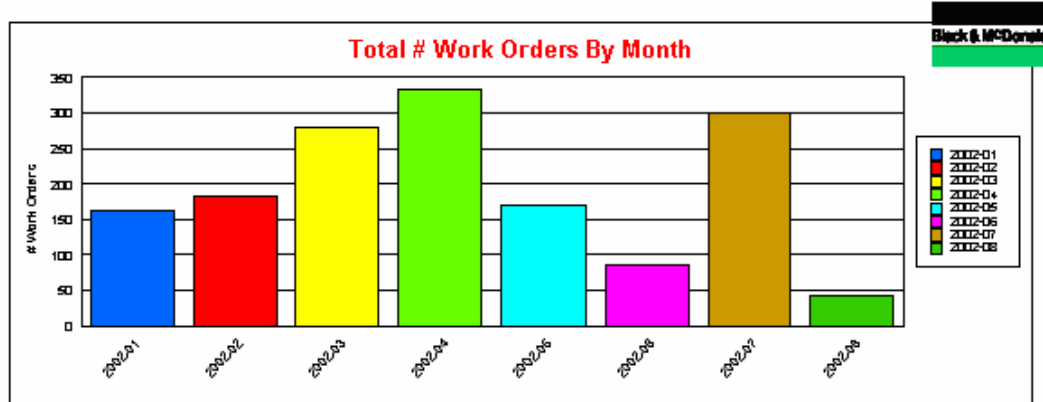
INVENTORY ITEM	VENDOR or EMPLOYEE NAME		DESCRIPTION	DATE	Reg Hrs	OT Hrs	OT Scale	UNITCOST	TOTAL
<b>50-650-0092730-COMMIYYCAC-40200 [Company ABC] JANITORIAL</b>									
00001181	CANADIAN WASTE SERVICES INC.		Waste Removal July	23-Jul-2002	1.00			363.10	363.10
00001181	CANADIAN WASTE SERVICES INC.		Waste Removal July	30-Jul-2002	1.00			233.59	233.59
					Hours:	0.00	0.00		<b>\$596.69</b>
<b>50-650-0092730-COMMIYYCAC-41100 [Company ABC] OPERATIONS &amp; MAINTENANCE</b>									
8757	HARRISON, PHILLIP		WORK	10-Jul-2002	1.00			20.73	20.73
8757	HARRISON, PHILLIP		WORK	19-Jul-2002	1.00			20.73	20.73
8757	HARRISON, PHILLIP		WORK	19-Jul-2002	1.00			21.87	21.87
8757	HARRISON, PHILLIP		WORK	24-Jul-2002	1.00			20.73	20.73
8757	HARRISON, PHILLIP		WORK	31-Jul-2002	1.00			20.73	20.73
8757	HARRISON, PHILLIP		WORK	31-Jul-2002	1.00			20.73	20.73
8760	LOWDER, BRIAN		WORK	19-Jul-2002	1.00			21.09	21.09
					Hours:	7.00	0.00		<b>\$146.61</b>
<b>50-650-0092730-COMMIYYCAC-41300 [Company ABC] HVAC/EMS</b>									
8760	LOWDER, BRIAN		WORK	12-Jul-2002	1.00			21.09	21.09
00001312	BLACK & MCDONALD LIMITED		PM AHU #1 Truck Cost 12/02	12-Jul-2002	2.50			7.50	18.75
00001312	BLACK & MCDONALD LIMITED		PM AHU #1 12/02	12-Jul-2002	2.50			47.05	117.63
					Hours:	1.00	0.00		<b>\$157.47</b>
<b>50-650-0092730-COMMIYYCAC-41500 [Company ABC] STRUCTURAL/ROOFING</b>									
8757	HARRISON, PHILLIP		WORK	18-Jul-2002	1.00			20.73	20.73
8760	LOWDER, BRIAN		WORK	18-Jul-2002	1.00			21.09	21.09
00001315	HOUSTON ROOFING LTD.		Frank's Office, Loading Dock Areas	22-Jul-2002	1.00			195.00	195.00
					Hours:	2.00	0.00		<b>\$236.82</b>

Report Date: 15-Oct-2002  
 Report Form: LAMAScript  
 Excluding "CH" - Chargeable Work Orders  
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### Detailed Audit Reports

Trend Analysis is provided via custom adhoc reporting tools. Since the database is ODBC compliant, third party tools can also be used for data analysis and data cubing.



	CH	CM	PM	TR	Total
2002-01	1	160	0	1	162
2002-02	0	180	0	15	184
2002-03	1	153	114	11	279
2002-04	2	160	196	15	333
2002-05	8	147	0	15	170
2002-06	5	73	0	9	87
2002-07	4	178	115	4	301
2002-08	0	42	0	0	42
Total	21	1,082	385	70	1,958

**Work Order Types**  
 CH: Changeable  
 CM: Corrective Repair  
 EV: Evaluation/Inspection  
 PM: Preventive Maintenance  
 TR: Temporary Request

Work Order Analysis by Work Order Type, By Month



## YTD Cost By Asset versus Average Cost By Asset Type Report

<u>E QNUM</u>	<u>DESCRIPTION</u>	<u>COST</u>
<b>Equipment Type: ACCU</b>		
ACCU-001+92733	Keeprite Air Conditioning Unit	\$ 721.13
	<i>Average Cost: \$</i>	<i>721.13</i>
<b>Equipment Type: AICP</b>		
AICP-001+92731	Air Compressor REMS Shop	\$ 825.00
AICP-001+92733	Air King Air Compressor ? Process	\$ 393.16
AICP-003+92733	D+Vidiss Air Compressor ? Controls	\$ 40.32
AICP-004+92733	Webster Air Compressor ? Fire Protection	\$ 62.24
AICP-005+92733	Rotair Air Compressor ? Screw	\$ 1,351.19
AICP-006+92733	Mattel Air Compressor ? Process	\$ 217.77
	<i>Average Cost: \$</i>	<i>421.61</i>
<b>Equipment Type: AIDY</b>		
AIDY-001+92733	Thompson Gordon Air Dryer ? Process	\$ 42.10
AIDY-005+92733	Rotair Air Dryer - For Screw	\$ 637.18
	<i>Average Cost: \$</i>	<i>339.64</i>
<b>Equipment Type: BFPV</b>		
BFPV-001+92733	DOMESTIC PREMISE ISOLATION BFP	\$ 105.86
BFPV-003+92733	BOILER FEED	\$ 306.00
BFPV-008+92733	FILM DEVELOPER, COLD WATER	\$ 40.32
BFPV-009+92733	FILM DEVELOPER, HOT WATER	\$ 618.65
	<i>Average Cost: \$</i>	<i>267.71</i>
<b>Equipment Type: BLRP</b>		
BLRP.HANGAR.92733	ALL PACKAGED BOILERS	\$ 20.16
BLRP-001+92733	Raypak Boiler	\$ 20.16
BLRP-002+92733	Raypak Boiler	\$ 20.16
	<i>Average Cost: \$</i>	<i>20.16</i>

Cost Analysis by Equipment Type Reports

