WELCOME *to* CADAFIS

COMPUTER ASSISTED DATA ACQUISITION & FACILITY INFORMATION SOFTWARE

CADAFIS PERFORMS:

- DATA ACQUISITION
- FACILITY ASSESSMENT
- COST ESTIMATING
- FINANCIAL ANALYSES
- CONTINUOUS PLANNING & BUDGETING
- CAPITAL STRATEGY

CADAFIS MISSION:

"The CADAFIS mission is to assist our clients with acquisition and analysis of capital facility data and the larger issue of capital strategy."

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CADAFIS TECHNIQUE

Dramatic advancements have taken place in the technology of data processing and automated drafting in the last couple of decades. Concurrently, hardly any advancment has occured in the technology of facility planning. CADAFIS has developed advanced techniques in data acquisition, data integration and data applications. The use of these combined techniques will provide management with improved processes of data acquistion and analyses with significant economic payoff solutions.

Data Acquistion - Mobile computing technology is used to acquire on-site data quickly and economically. The acquired data consists of facility condition, functional adequacy and costs. Three different levels of data, from conceptual to general to detailed data, may be acquired.

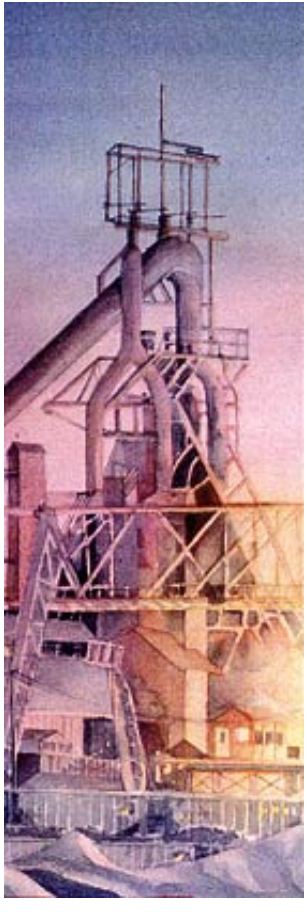
Data Integration - CADAFIS automatically updates and integrates continuously changing data that will impact capital allocation decisions. This provides a continuous planning and budgeting process.

Data Application - The integrated data applications provide support for cost-effective capital allocations. Although capital is only a very small percent of the total cost of delivery of services or products - once capital is "built-in", it will have a profound influence upon the institution's future policies, procedures and operating costs. The key is to factor capital renewal and/or mainteneance repair costs before capital is "built-in". CADAFIS applications allow users to analyze hypothetical solutions seeking least cost combinations of capital and operating costs. The applications perform life cycle costs and financial analyses.

The strength of the CADAFIS technique is its performance in the hands of local users. As user skills develop, reliance upon outside support decreases. Capital requests for repair or replacement will be supported with up-to-date, uniform data, analyses and reports.

SUMMARY

Facility capital planning has been likened to the stage of the Model T in automotive development. It need not be. CADAFIS has developed advanced techniques in the acquisition, integration and application of data for use by capital facility decision makers.



Facility Asset Inventory / Capital Budget Planning

FAI/CBP SOFTWARE

FAI/CBP: An up-to-date inventory of facility assets is essential for good facility management and objective capital budgeting. The software addresses and records: 1) description 2) location 3) deficiencies 4) priority 5) cost estimates of repair or replacement and 6) Facility Cost Index (FCI).

Leading national cost estimating services provide annual updates of cost data that has been factored for over 300 cities and for 72 different building types. The cost data, which is divided into 3 levels of detail is coordinated and/or embedded in the FAI/CBP software. Data is presented in Uniformat II and CSI format per industry standards.

The FAI/CBP program is designed for all types of facilities. Special modules have been developed for the following types of institutions:

- ***Hospitals & Healthcare***
- ***Correctional & Justice***
- ***University Residency***
- ***Schools & Educational***
- ***Port Authority***
- ***Government Agencies***

FAI/CBP is adapted for use by governmental entities to perform audits of facility depreciated value for GASB 34 requirements. Other applications include facility inspections and punch lists.

Facility planning, management & budgeting will never be a proactive type without an asset inventory and accurate costing. Data acquisition is done by portable pen based computer technology. Data may also be acquired manually by printed forms. Local facility managers may simultaneously discuss and view reports on their computer screen with remotely located central management and CADAFIS support personnel using secure, remote technology.

Facility Assessment and Capital Strategy

FACS SOFTWARE

FACS: The FACS module consists of a basic format which performs: 1) assessments of facility condition and adequacy 2) cost estimating & financial analyses 3) customized program planning & simulation of hypothetical "what if" solutions. Cost data from FAI/CBP may be used for FACS.

Facility Assessment and Capital Strategy
"What if" solutions are developed jointly by a team consisting of the owner and CADAFIS professionals who have bivalent skills of Process Improvement Facilitators and Architects.

There are two forms of process improvements which are often combined: 1) Elimination of non-value added work and, 2) Adding new features to meet customers needs. The CADAFIS planning technique differentiates between value added and non-value added work. Analysis is directed to purpose and workflow. Both management and line personnel scrutinize their objectives and their ties to internal and external customers and suppliers.

Preferred solutions are simulated to find the least cost combination of capital costs, payroll and operating costs. The "what if" solutions are factored for the impact of capital expenditures upon operating costs. Savings are stated in terms of present value.

Due to the non-profit character of the institutions such as healthcare, educational, correctional, university residency, port authority and government agencies, there has been a dearth of planning technology that addresses the substitution of capital costs for operating costs. Significant cost savings have been achieved in the private, for-profit sector in the substitution of capital for payroll costs.

ROOFING SOFTWARE

ROOF INSPECTION, ASSESSMENT, RETROFIT DESIGN & LIFE CYCLE COST ANALYSIS

The roofing program consists of 4 separate modules which will perform the following:

1. **Inspections** of roof projects in progress and annual inspections. Electronic and hard copy reports may be made at the job site.
2. **Assessments**, analyses and estimates of costs for repair or replacement of existing roofs.
3. **Retrofit Design** - Preparation of construction details & documents for roof repair or replacement.
4. **Life Cycle Cost Analysis** to compare costs of present value of different roof systems, energy and insulation. **Roofing Life Cycle Cost Analyses - 3 Options**

ADA SOFTWARE

ADA COMPLIANCE SURVEY

The Americans with Disabilities Act compliance survey is a computerized program which performs ADA surveys and reports of existing buildings. The ADA screen data is presented in a logical sequence. Each selection triggers an adjacent menu relating to the preceding selection. The ADA compliance screen includes the location of the ADA deficiency, records the deficiency, the task to correct the deficiency, and the cost to repair or replace the deficiency. Data acquisition is done quickly & economically with portable pen based computer technology.

ROOFING SOFTWARE

We offer 4 advanced modules that simplify data acquisition, management, and reports for:
Roof Inspection - Roof Assessment - Roof Retrofit Design - Roof Life Cycle Cost Analysis

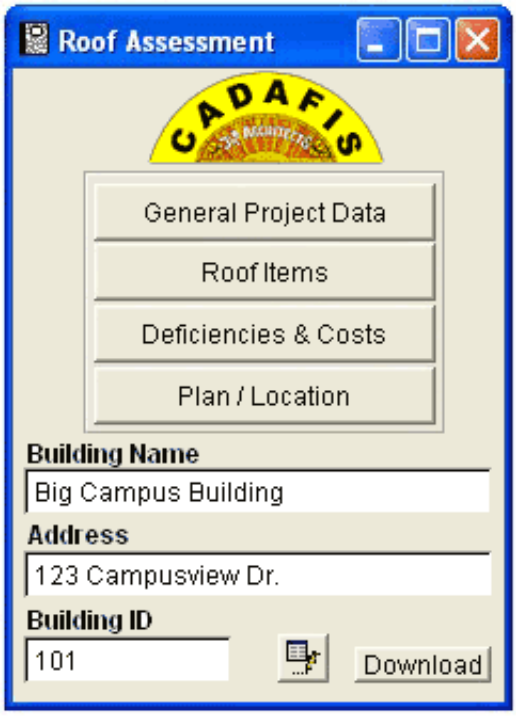
ROOF INSPECTION

- The **CADAFIS** Handheld Pocket PC performs roof inspections in a fraction of the time that it takes using conventional means.
- Enter your data in pull-down menus
- Creates impressive reports at the touch of a button for any roof system
- Software formatted to include:
  - Graphic Construction Details
  - Photographs
  - Field Notes
  - Roof Plans
- Voice Notes and Speaker
- Facility managers may easily track roof conditions and produce status reports.
- Customize the menus to your product and inspection standards
- Download, link, email, or fax your reports from any PC

ROOFING SOFTWARE

We offer 4 advanced modules that simplify data acquisition, management, and reports for:
Roof Inspection - Roof Assessment - Roof Retrofit Design - Roof Life Cycle Cost Analysis

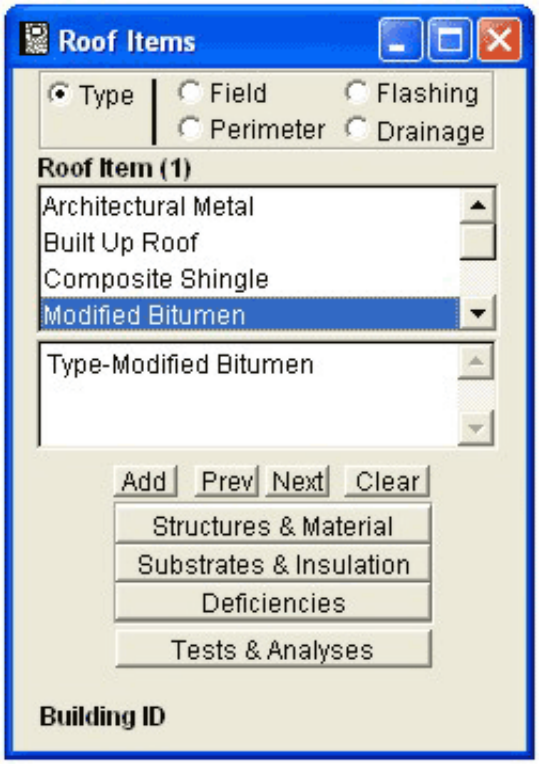
ROOF ASSESSMENT



- Assess roof conditions with CADAFIS Handheld Pocket PC
- Make estimates of cost of replacements or repairs

MENUS
Enter the data from main menu shown to the left.
Additional menus describe:

- Type of roof (see Roof Items below: Perimeter, Drainage, Field, Flashing)
- Structures on the roof and their Materials
- Substrates and Insulation
- Test requirements, test analyses, core descriptions and fasteners
- Deficiencies
- Priorities
- Costs
  - Number of units
  - Unit cost
  - Total cost



REPORTS
Produce reports quickly on your company letterhead.

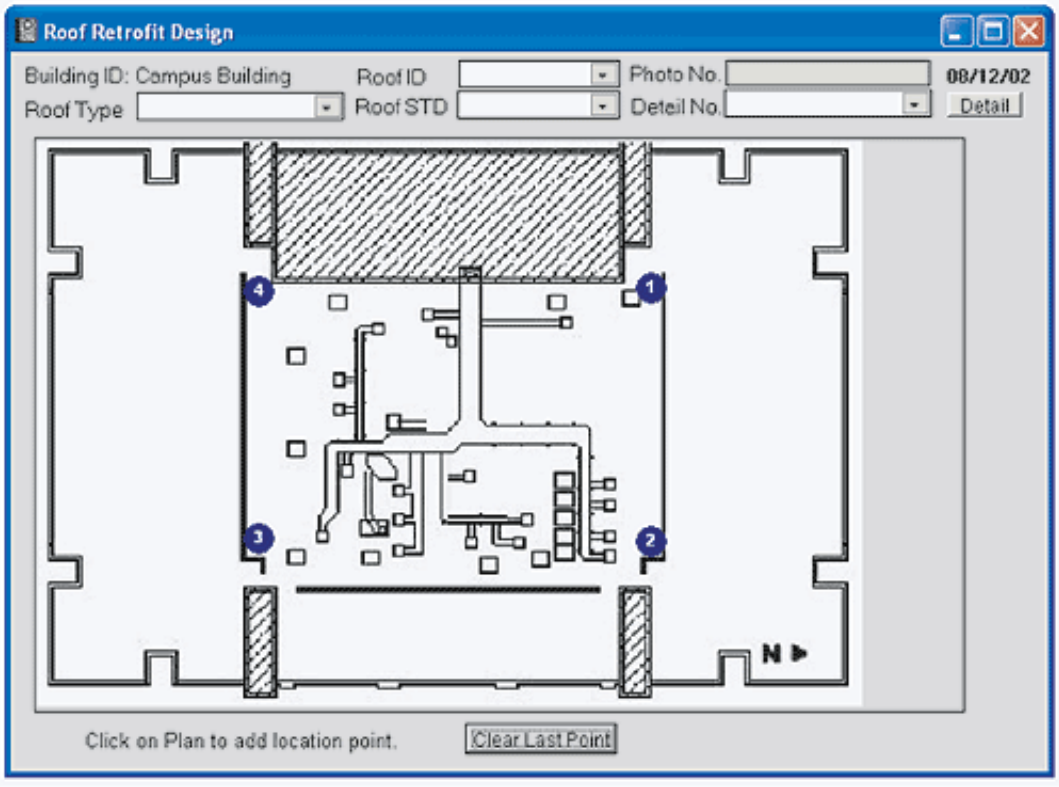
- **Assessment Report** - deficiencies of roof items, priority, and location
- **Cost Report**- unit and total costs using local costs or R.S. Means cost data
- **Test Report**- various tests, core samples, and moisture test (ASTM or modified)
- **Plan Report**- roof plan keyed to location of deficiencies, tests, photos, and notes
- **Summary Report**- ratio of repair to replacement costs for each roof, and 5 year budget by priorities.

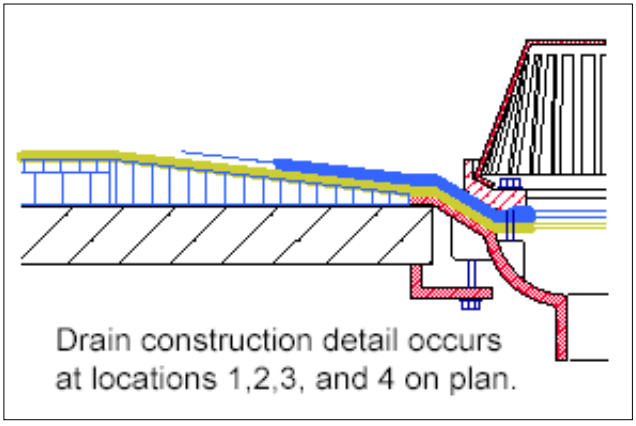
ROOFING SOFTWARE

We offer 4 advanced modules that simplify data acquisition, management, and reports for:
Roof Inspection - Roof Assessment - Roof Retrofit Design - Roof Life Cycle Cost Analysis

ROOF RETROFIT DESIGN

- Produce design solutions for roof repairs or replacement using the **CADAFIS Retrofit Design Module** and portable pen-based technology
- Use the customized setup to enter your roof plan and standard details into the system
- Match roof construction details to plan locations to produce in-house or contract work description





MENUS

Roof Type Menu
- Architectural metal
- Built-up roof
- Composition shingle
- Modified Bitumen
- Spray foam
- Slate
- Structural Metal
- Thermoplastic
- Thermoset
- Tile
- Wood Shingle

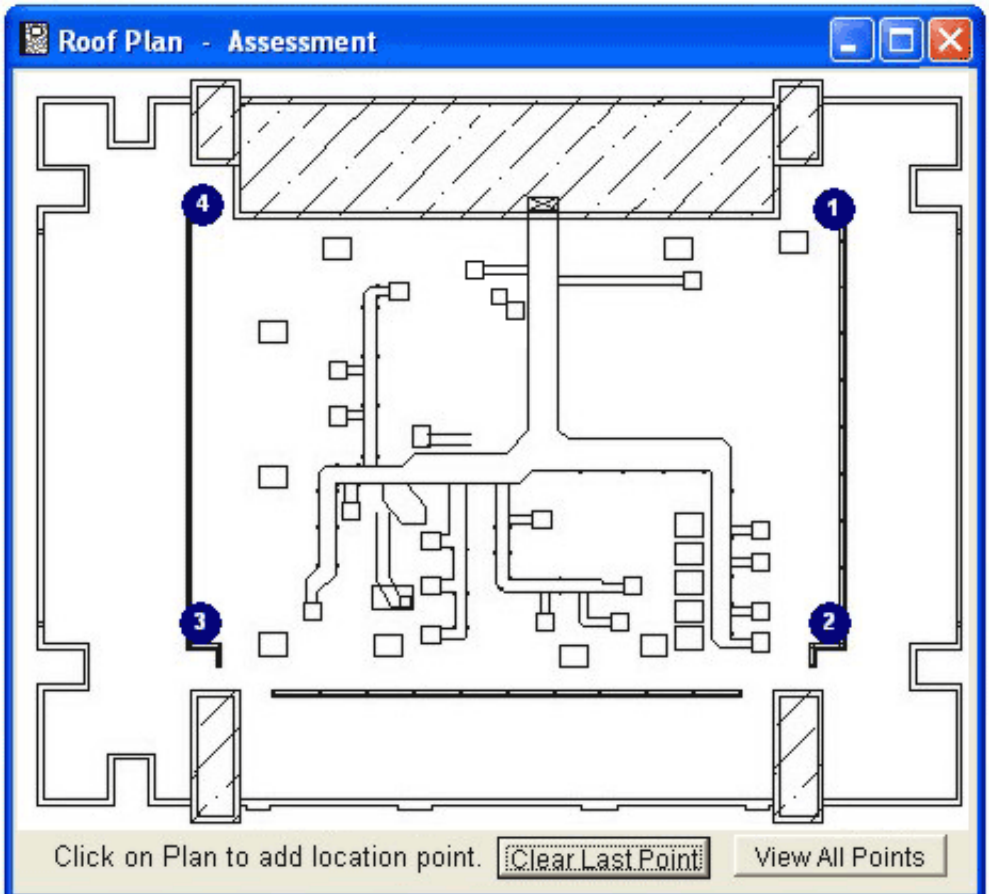
Protective Membrane & Green Roofs are features of basic types of roof.

Roof Standard Menu
Roof manufacturers matched to roof type.

Detail No. Menu and ***Detail***
Graphic construction details matched to the specific manufacturer.

REPORTS

The ***Retrofit Design Report*** shows the location of all details and notes necessary to achieve the project repair or replacement design solutions. The Roof Plan and Design Report may be matched to the user's AutoCAD to produce more detailed contract documents.


Roof Plan - Assessment
4
1
3
2
Click on Plan to add location point.
Clear Last Point
View All Points

ROOFING SOFTWARE

We offer 4 advanced modules that simplify data acquisition, management, and reports for:
Roof Inspection - Roof Assessment - Roof Retrofit Design - Roof Life Cycle Cost Analysis

ROOF LIFE CYCLE COST ANALYSIS - LCCA

- **FAST** - worksheet automatically loads data
- **ESSENTIAL -** for professional presentations
- **IMPRESSIVE** - You will get serious consideration
- **EASE THE SALE** - Using the LCCA from CADAFIS

LCC Analysis - Three roof options are analyzed. Each option has different capital and operating costs.
LCCA of roof options 2 & 3 are shown to the below. Option 3, stated in terms of present value, **saves $200,000**!

ROOF LIFE CYCLE COST ANALYSIS

BUILDING ID: KENWOOD ELEMENTARY SCHOOL

SUBJECT: OPTION 2: MAINTAIN EXISTING 40,000 SF ROOF. PURCHASE A SERVIC
WITH BUR USING R-18 INSULATION.

A	B	C	D	E	F	G	H	J	V	W	X
YEAR	DISCOUNT FACTOR	CAPITAL EXPENSE	ADDITIONAL INSULATION EXPENSE	TOTAL CAPITAL EXPENDITURE (C+D)	INFLATION FACTOR GROSS	INFLATION FACTOR (ENERGY)	CAPITAL EXPENSE AFTER INFLATION (E×F)	PRESENT VALUE CAPITAL EXPENSE AFTER INFLATION (H×B)	TAX REDUCTION OPERATING COSTS (U x "ETR")	TOTAL OPERATING COSTS AFTER TAX REDUCTION @ PRESENT VALUE (U-V) X B	TOTAL NET EXPENSE PRESENT VALUE (J+M+W)
TODAY	1	0		0	1	1	0	0			$0
1	0.9524				1.03	1.0900		0	$0	$20,295	20,295
2	0.9070				1.0609	1.1881			$0	$19,185	19,185
3	0.8638				1.0927	1.2950			$0	$19,719	19,719
4	0.8227				1.1255	1.4116			$0	$20,271	20,271
5	0.7835				1.1593	1.5386			$0	$21,025	21,025
6	0.7462				1.1941	1.6771			$0	$21,970	21,970
7	0.7107	120,000		120,000	1.2299	1.8280	147,587	104,887	$0	$20,476	125,363
8	0.6768				1.2668	1.9926			$0	$18,999	18,999
9	0.6446				1.3048	2.1719			$0	$19,644	19,644
10	0.6139				1.3439	2.3674			$0	$20,480	20,480
11	0.5847				1.3842	2.5804			$0	$21,176	21,176
12	0.5568				1.4258	2.8127			$0	$21,899	21,899
13	0.5303	300,000	6,000	306,000	1.4685	3.0658	446,563	236,822	$0	$9,614	246,436
14	0.5051				1.5126	3.3417			$0	$7,357	7,357
15	0.4810				1.5580	3.6425			$0	$8,502	8,502
16	0.4581				1.6047	3.9703			$0	$8,740	8,740
17	0.4363				1.6528	4.3276			$0	$8,989	8,989
18	0.4155				1.7024	4.7171			$0	$9,249	9,249
19	0.3957				1.7535	5.1417			$0	$9,521	9,521
20	0.3769				1.8061	5.6044			$0	$9,804	9,804
21	0.3589				1.8603	6.1088			$0	$5,734	5,734
22	0.3418				1.9161	6.6586			$0	$10,408	10,408
23	0.3256				1.9736	7.2579			$0	$10,730	10,730
24	0.3101				2.0328	7.9111			$0	$11,065	11,065
25	0.2953				2.0938	8.6231			$0	$11,414	11,414
26	0.2812				2.1566	9.3992			$0	$11,779	11,779
27	0.2678				2.2213	10.2451			$0	$12,158	12,158
28	0.2551				2.2879	11.1671			$0	$12,553	12,553
29	0.2429				2.3566	12.1722			$0	$12,965	12,965
30	0.2314				2.4273	13.2677			$0	$13,393	13,393
TOTALS		420,000	6,000	426,000			594,150	341,709	$0	$429,113	770,822

ROOF LIFE CYCLE COST ANALYSIS

BUILDING ID: KENWOOD ELEMENTARY SCHOOL **ROOF ID**

SUBJECT: OPTION 3: REPLACE 40,000 SF EXIST ROOF WITH BUR, USING R-28

A	B	C	D	E	F	G	H	J		W	X
YEAR	DISCOUNT FACTOR	CAPITAL EXPENSE	ADDITIONAL INSULATION EXPENSE	TOTAL CAPITAL EXPENDITURE (C+D)	INFLATION FACTOR GROSS	INFLATION FACTOR (ENERGY)	CAPITAL EXPENSE AFTER INFLATION (E×F)	PRESENT VA CAPITAL EXPENSE AFTER INFLATIOI (H×B)	K TION TING TS TR")	TOTAL OPERATING COSTS AFTER TAX REDUCTION @ PRESENT VALUE	TOTAL NET EXPENSE PRESENT VALUE (J+M+W)
TODAY	1	300,000	14,000	314,000	1	1	314,000	314			$314,000
1	0.9524				1.03	1.0900			$0	$3,596	3,596
2	0.9070				1.0609	1.1881			$0	$3,950	3,950
3	0.8638				1.0927	1.2950			$0	$5,001	5,001
4	0.8227				1.1255	1.4116			$0	$5,094	5,094
5	0.7835				1.1593	1.5386			$0	$5,193	5,193
6	0.7462				1.1941	1.6771			$0	$5,297	5,297
7	0.7107				1.2299	1.8280			$0	$5,407	5,407
8	0.6768				1.2668	1.9926			$0	$5,524	5,524
9	0.6446				1.3048	2.1719			$0	$5,646	5,646
10	0.6139				1.3439	2.3674			$0	$5,774	5,774
11	0.5847				1.3842	2.5804			$0	$5,909	5,909
12	0.5568				1.4258	2.8127			$0	$6,051	6,051
13	0.5303				1.4685	3.0658			$0	$6,200	6,200
14	0.5051				1.5126	3.3417			$0	$6,356	6,356
15	0.4810				1.5580	3.6425			$0	$6,520	6,520
16	0.4581				1.6047	3.9703			$0	$6,691	6,691
17	0.4363				1.6528	4.3276			$0	$6,870	6,870
18	0.4155				1.7024	4.7171			$0	$7,058	7,058
19	0.3957				1.7535	5.1417			$0	$7,254	7,254
20	0.3769				1.8061	5.6044			$0	$8,957	8,957
21	0.3589	100,000	0	100,000	1.8603	6.1088	186,029	66	$0	$7,139	73,913
22	0.3418				1.9161	6.6586			$0	$8,028	8,028
23	0.3256				1.9736	7.2579			$0	$8,259	8,259
24	0.3101				2.0328	7.9111			$0	$8,500	8,500
25	0.2953				2.0938	8.6231			$0	$8,752	8,752
26	0.2812				2.1566	9.3992			$0	$9,015	9,015
27	0.2678				2.2213	10.2451			$0	$9,289	9,289
28	0.2551				2.2879	11.1671			$0	$9,575	9,575
29	0.2429				2.3566	12.1722			$0	$9,873	9,873
30	0.2314				2.4273	13.2677			$0	$10,183	10,183
TOTALS		400,000	14,000	414,000			500,029	380	$0	$206,961	587,734

CONSULTING SERVICES

CADAFIS provides professional consulting services as well as professional support for CADAFIS software. Our portable software will reduce the time of inventory, assessment and calculation tasks by more than one third over where these tasks are performed with pencil & paper. On projects that involve many facilities that are geographically dispersed, services may be performed by our network team of A/E and CM Partner Consultants.

I. *PROFESSIONAL CONSULTING*
CADAFIS professional consulting services involve facility data acquisition, analyses, process improvement initiatives, recommendations, reports, data integration with central data management systems, presentations to funding authorities and implementation of solutions.

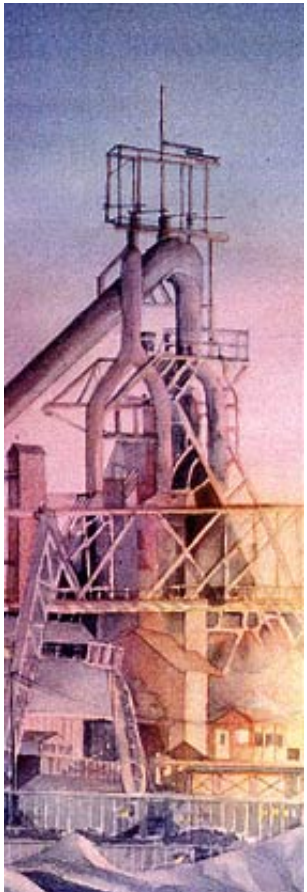
II. *EDUCATION & TRAINING*
CADAFIS education and training support will involve the client's management and line personnel in the complete spectrum of programs for data acquisition, analyses, process improvements and supporting proposals for hypothetical solutions. A major objective of the Education and Training Support is to eventually enable the users to perform these services for themselves with less dependence upon outside support.

III. *SOFTWARE SUPPORT*
CADAFIS provides computer support by both on-site and remote technology. The remote technology will permit the connection of all local facility files with central corporate management. Local facility managers will become less dependant upon support as they develop improved skills with the CADAFIS program.

Facility Asset Inventory/Capital Budget Planning (**FAI/CBP**), **ROOFING** and **ADA** programs deal with capital facility physical conditions. The Facility Assessment & Capital Strategy (**FACS**) program deals with more comprehensive facility issues which include the facility functional adequacy to accomodate service operations and/or production processes. **FACS** provides the potential for dramatic economic benefits.

The CADAFIS programs are not facility maintenance programs. Of the more than 200 electronic facility maintenance programs that are available, none will contain the owner's facility inventory. CADAFIS will acquire the asset inventory and integrate it with the client's maintenance program requirements. No maintenance program will be a preventive type without asset inventory. Without asset inventory and an assessment of asset conditions there can be no reliable cost analyses.

CADAFIS provides capital asset managers with useful facility software programs, support and consulting.



Facility Asset Inventory / Capital Budget Planning

FAI/CBP METHODOLOGY

The **FAI/CBP** program is designed for use with over 70 types of building facilities. Three levels of data and costs; from conceptual, to general, to detailed may be acquired, analyzed and reported. Level I is conceptual, consisting of 7 facility components that are integrated with assessment of physical conditions and costs. Level III is detailed, consisting of a combination of components, subcomponents, and features which may be matched with over 18,000 cost items.

The cost database is an annually updated derivative of the R.S. Means cost databases and is formatted in both CSI and Uniformat II. Each facility is analyzed by size, age and construction type and assigned a replacement cost for the basis of capital planning. The preformatted reports make it easy to provide a comprehensive, uniform planning document.

FAI is the most advanced software and hardware system for the rapid inventory and assessment of the physical condition of facilities and their components, Quick and simple to use, FAI provides touch screen floor plans of your building and pull down menus describing all aspects of the building, the building envelope and the building component systems. The inventory may also be used for the basis of a predictive maintenance program.

CBP is a program that harvests the output of FAI software, generating capital budgets for the repair and maintenance, or planned replacement of, facilities and their components. The software automatically updates new reports from FAI and performs several budgeting and life cycle cost analyses including capital budget projections and analysis of component repair versus replacement.

Facility Asset Inventory / Capital Budget Planning

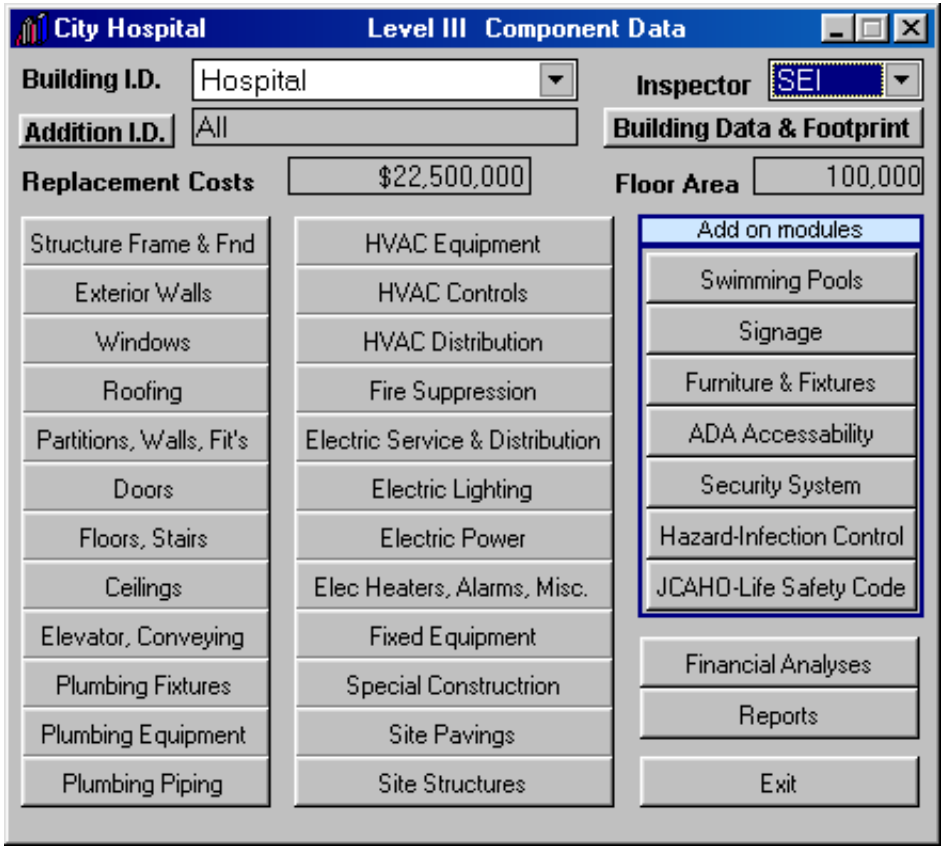
FAI/CBP METHODOLOGY

CADAFIS Inc. develops special modules for specific types of facilities and operations such as education, port authority and healthcare facilities. An example is FAI/CBP Hospital.

HOSPITAL & HEALTHCARE STARTUP SCREEN:

The screen shown to the right consists of basic Level III components and Add-on modules that are specifically tailored to the facility asset management of hospitals and health care facilities. Data is acquired and reported for each separate building addition. The **"Addition I.D."** pull down menu assigns data to that specific addition file.

Additionally, the FAI/CBP Hospital system acquires and reports data that will influence capital budget decisions of the facility. **"Fixed Equipment"** addresses hospital diagnostic and treatment equipment. **"Hazard/Infection Control"** and "**Life Safety Code"** regimens are assessed and reported per the standards of the Joint Commission Accreditation Hospital Organization. Reporting functions follow a standard, easy to use format. The CBP features allow comparison of planning alternatives, complete with life cycle costing and present value analysis.



DATA ACQUISITION -Data is acquired by mobile computer technology. A click on any component of the Level III component screen will present that particular component. The selected screen will display subcomponents, features and menus which address 1)The Description, 2) Location, 3) Deficiencies, 4) Priorty and 5) Costs for Repair or replacement of building components. An example of a component data screen and reports follow on Page 2.

Facility Asset Inventory / Capital Budget Planning

FAI/CBP METHODOLOGY

TYPICAL COMPONENT: After the desired Component has been clicked from the Start Up Screen, the respective Component Screen will appear. The Doors & Frames Screen is shown below. A click on the "**Plan**" button produces the Floor Plan shown on the next page.

The following menu headings appear on the Doors & Frames screen.

LOCATION - The menu presents names of locations. The "**Plan**" button will produce a plan with co-ordinates. Touching the pen to "**Plan**" will display the co-ordinates of the location. The location will be a point (1), a line (2), or an area (3), of which each will be reported as a number and a spot on the report plan.

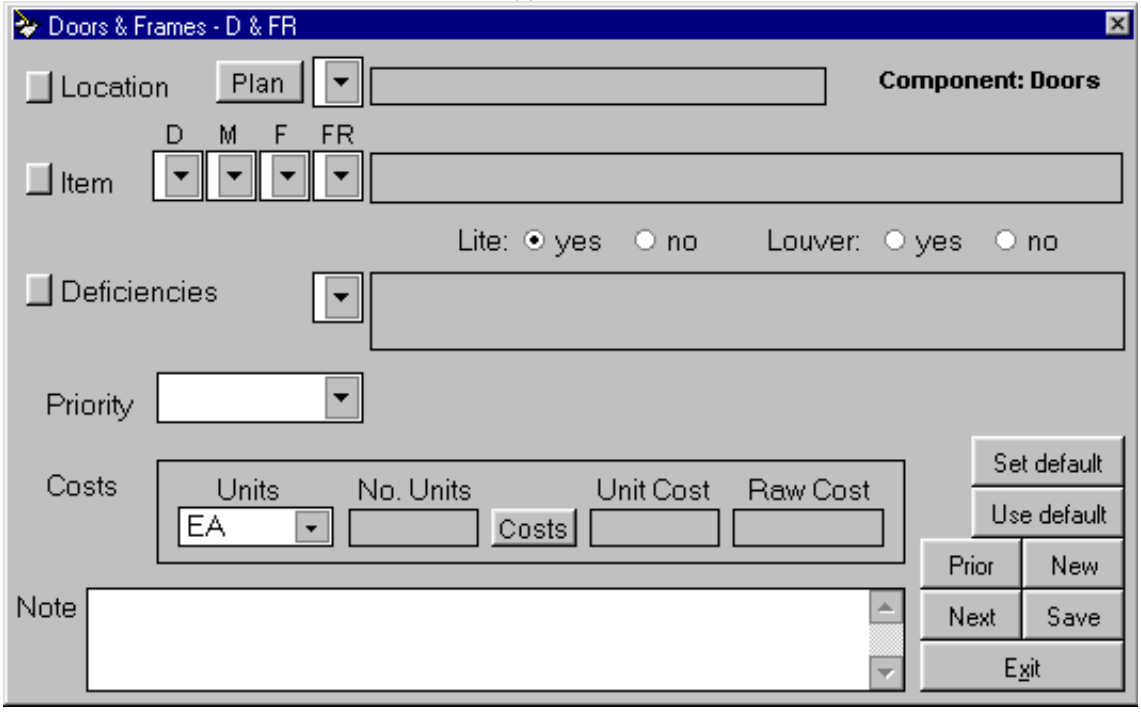
ITEM COMPONENT - Four menus will describe all known characteristics: **D** - floor types, **M** - materials, **F** - features, and **FR** - frames. additional buttons access special features.

DEFICIENCIES - This menu presents a choice of descriptions of observed deficiencies.

PRIORITY - A scale of 1 to 10 indicates the urgency for the correcting of a deficiency.

COST MODULE - The units, no. of units, and unit cost, once entered, will calculate raw cost automatically. The "**Costs**" button option will access the R.S. Means cost database.

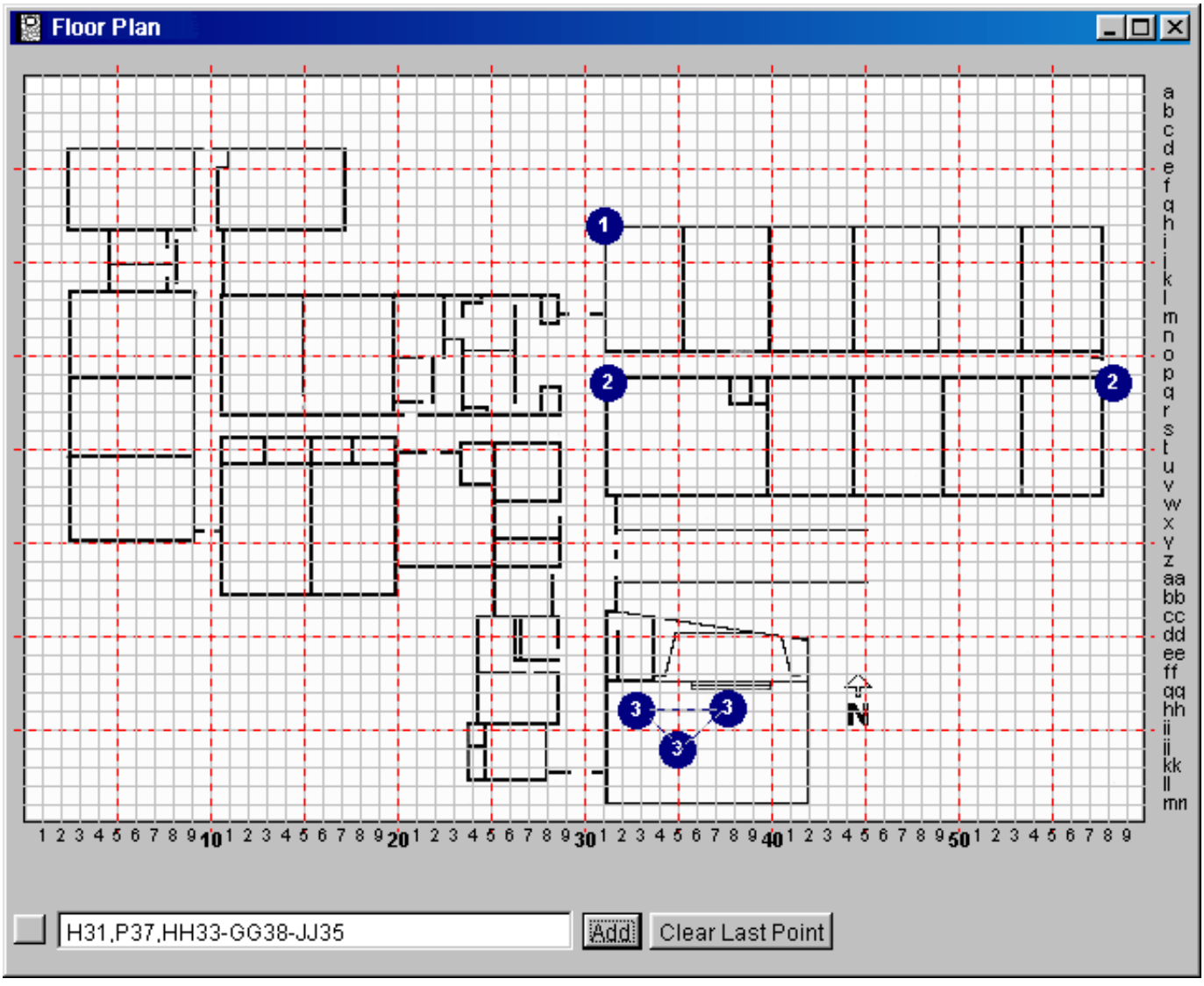
NOTE - Additional data may be entered onto the screen by an alphanumeric screen keyboard or handwriting, which is converted to printed text.



Facility Asset Inventory / Capital Budget Planning

FAI/CBP METHODOLOGY

TYPICAL FLOOR PLAN: The locations of described items are identified in the report by numbers.
The numbers will indicate a point (1), a line (2), or an area (3).



REPORTS: Data entries of asset descriptions, deficiencies, priorities and costs will be sent to the database from which standard reports may be produced. The types of standard reports are shown below. The basic reports with variations may number up towards 100. Custom reports are easily produced. Graphic floor plans of the facility with underlying grids are produced as reports.

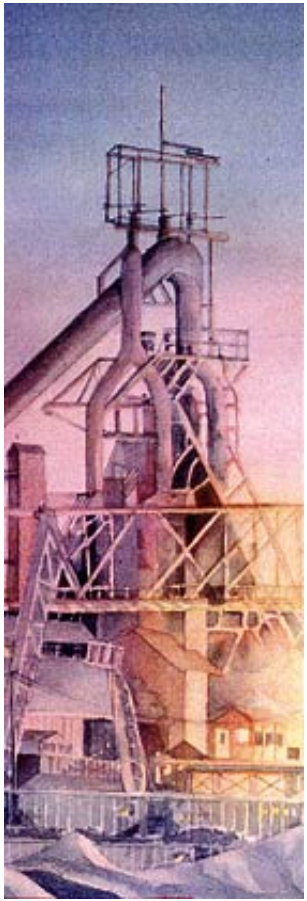
1. COSTS:
- **A.** Building Component Deficiencies Costs
- **B.** Building Deficiences by Priority
- **C.** Schedule of Capital Budget Item Requests
- **D.** 5 Yr projection of Capital Budget Items
- **E.** Organization Wide Summary

2. COST ANALYSES:
- **A.** Life Cycle Cost Analysis & present value
- **B.** Ratio of Repair to Replacement Costs (FCI)

3. DEFICIENCIES:
- **A.** Building Component Deficiencies
- **B.** Queries of All Same Components

4. FACILITY GRAPHIC PLANS:
- **A.** Site Plan
- **B.** Floor Plan, Floors 1,2,3, etc.
- **C.** Roof Plan

5. BUILDING DATA & FOOTPRINT:
- **A.** Construction Type, Use Class, Size, Age & Perimeter
- **B.** Replacement costs indexed for geographic location



Facility Assessment and Capital Strategy

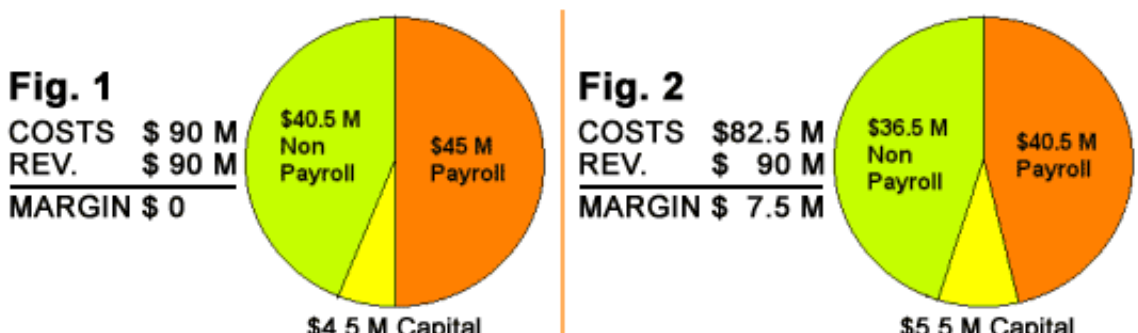
FACS METHODOLOGY

FACS - HOSPITAL AND HEALTHCARE - Solutions to Improve Operating Margins

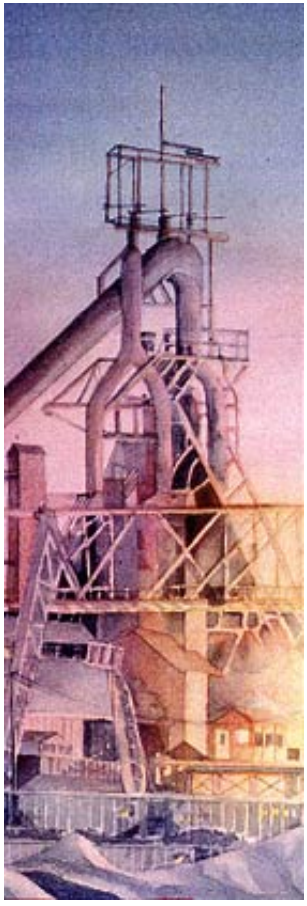
Continuous capital allocation is essential to hospital service. Two broad considerations influence the expenditures of capital by hospitals. They are typically, 1) capital expenditures made to increase types and amounts of products or services and 2) capital expenditures made to reduce operating costs. It is in both of these categories where CADAFIS has been successful in the integration of and planning for solutions with least cost combinations of capital and operating costs.

Capital is only a very small percent (5% to 6% for general, non-teaching hospitals) of the total cost of hospital services over the life of that capital facility. Once capital equipment or facility is locked into place, it will have a profound impact upon future policies, processes, and operating costs. The key is to cost it out before it is locked into place.

For example: In **Fig. 1**, existing facility conditions, functional adequacies and operations are analyzed. In **Fig 2**, process improvement initiatives gain staff consensus and a "what if" solution with a new capital configuration is proposed. The preferred solution seeks the least cost combination of capital costs and operating costs. A comparison is shown of the present operation **Fig. 1**, and the preferred solution **Fig. 2**.



In the **Fig. 1**, the subject, general hospital is operating at an annual cost of $90 million, with revenue of $90 million. In **Fig. 2**, process improvements are made which require capital expenditures of $20 million. These improvements result in an 8.3% reduction in operating expenses and a margin increase of $7.5 million per year, the first year. In the example of **Fig. 2**, cost and process improvements drive the solution. Payroll and non-payroll savings are sought. Any small savings in labor will result in very significant savings later on. That is because operating costs inflate over time while capital does not.



Facility Assessment and Capital Strategy

FACS METHODOLOGY

FACS - HOSPITALS AND HEALTHCARE - Solutions to Improve Operating Margins

The relation of capital costs vs. operating costs poses an interesting consideration in estimating what capital expenditures will add value. Several factors are considered in determining whether the present value of savings in operating costs will be greater than the outlay for capital expenditures. These factors incluce interest rates, discounting, and present value associated with the following conditions:

- The change of any hospital activity center or product line includes a new capital configuration and altered operating/managerial techniques.
- For the redesign of any hospital activity center there is a set of original capital outlay costs, call them C's. There may also be an associated set of cost savings of various kinds, call them S's.
- The sum of all the C's is the capital outlay the hospital must make initially to bring out process improvements.
- The S's are savings spread over future years, hence must be discounted back to present value equivalent.
- If the present value of all the S's are greater than all the C's the capital project is economically feasible.

The CADAFIS - FACS methodology identifies product and service units, activities, process flow, frequency and time of intra- and inter-departmental transactions. Analyses of simulated functions may be confined to one department (intra-departmental) activity, or a process which would involve inter-departmental activities such as administration, clinical, dietary and other departments. There are over 20,000 repetitive and customary tasks that are performed by the staff in a typical 200-bed hospital. There are many opportunities to improve upon these tasks or groups of tasks commonly referred to as processes.

"Hospitals can reduce operating expenses 20% to 40% if they implement process (quality) improvement programs fashioned after those used in other industries".

Source: "Quality Management for Health Care Delivery" by the Hospital Research and Educational Trust for the AHA

The unique aspect of CADAFIS - FACS methodology is that it is a relaxed simulation technique. The CADAFIS simulation avoids use of abstract numbers and formulas that would confuse the process. What purpose is served to apply complex algorithms where there is no clarity in concepts and problems to which they are being applied? Thus, the approach is relaxed with people talking about problems and the ways to solve them. Analysis is directed to the workflow of a product or service. CADAFIS facilitates the planned activities which bring about proposed improvements. CADAFIS involves the staff participants in scrutinizing their ties to suppliers, support activities, inventory management, reasoning behind workstation setup and flow of personnel, information, materials, and facility layout. The facility cost index is brought into the equation in determining whether to renovate, repair or build new. Many re-engineering projects fail because they do not observe the economics of the real world, and that is: staff must be to involved in both capital and operating cost considerations because each affects the other.

Life Cycle Cost Analyses

LCC METHODOLOGY

Life cycle cost analysis provides a method for comparing two or more functionally similar aspects of a building component. Each must have a specific first cost (capital) and a predictable second cost (operations). Calculations may be made for any period of time.

The FAI/CBP module provides several financial analyses. The LCC analysis consists of a standard worksheet where certain variables are entered, basically; Interest Rates, Inflation Rates for both operation and energy, Capital Costs and Operating Costs. Depreciation and tax rates are automatically factored for for-profit businesses.

All of the data is loaded automatically from the Worksheet except for columns P, Q, R & S in the Spreadsheet. The Spreadsheet calculations are done automatically (spreadsheet is on next page) . The objective of the Life Cycle Cost Analysis is to determine the total net expense. However, the net expense must be stated in present value in order to accommodate the time value of money. The total present value net expense is shown in column X for each option.

An example of one of the spreadsheets for the 3 options is shown above. The initial capital requirements are higher for Option 3 over Options 1 & 2. However, Option 3 results in approximately $200,000 in savings.

Option 1: Replace the 40,000 SF roof with a 20-year roof. The insulation will be R-18. In year 20 apply a flood coat.

Option 2: Maintain the existing roof for a few more years knowing the R value is low, and that maintenance costs will continue. In year 6, make repairs and apply a flood coat. In year 12 apply a new 20 year roof with R-18 insulation.

Option 3: Replace the 40,000 SF roof with a new 20-year roof. Increase the insulation value to R-28. In year 20 apply a flood coat.

ROOF LIFE CYCLE COST ANALYSIS

CONSULTANT: Cadafis Inc. 48 Thurman Ave, Columbus, Oh 43206

BUILDING ID: KENWOOD ELEMENTARY SCHOOL **ROOF ID**: ABC

SUBJECT: OPTION 1: REPLACE THE 40,000 SF EXISTING ROOF WITH BUR, USING R-18 INSULATION. FLOOD COAT THE ROOF IN YEAR 20. PURCHASE A SERVICE PLAN FOR THE ENTIRE DISTRICT.

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X
YEAR	DISCOUNT FACTOR	CAPITAL EXPENSE	ADDITIONAL INSULATION EXPENSE	TOTAL CAPITAL EXPENDITURE	INFLATION FACTOR GROSS	INFLATION FACTOR (ENERGY)	CAPITAL EXPENSE AFTER INFLATION (ExF)	PRESENT VALUE CAPITAL EXPENSE AFTER INFLATION	CAPITAL EXPENSE DEPRECIATION ALLOWANCE (H/LIFE YRS)	EFFECTIVE TAX REDUCTION DEPRCTN ALLOWANCE (Kx"ETR")	EFFECTIVE TAX REDUCTION PRESENT VALUE (LxB)	ENERGY COSTS AFTER INFLATION	RR ROOF REPAIR COSTS	IR INTERIOR REPAIR COSTS	RC ROOF CONSULTING COSTS	PM PREVENTIVE MAINT. COSTS	TOTAL RR, IR, RC, PM (P+Q+R+S)	TOTAL ENERGY, REPAIR, CONSULT, MAINT COSTS AFTER INFLATION (TxF)+N	TAX REDUCTION OPERATING COSTS (Ux "ETR")	TOTAL OPERATING COSTS AFTER TAX REDUCTION @ PRESENT VALUE (U-V) X B	TOTAL NET EXPENSE PRESENT VALUE (J+M+W)
TODAY	1	300,000	6,000	306,000	1	1	306,000	306,000													$300,000
1	0.9524				1.03	1.0900		0	($7,846)	$0	$0	$3,997			$800	$0	$800	$4,821	$0	$4,591	4,591
2	0.9070				1.0609	1.1881			($7,846)	$0	$0	$4,749			$800	$0	$800	$5,597	$0	$5,077	5,077
3	0.8638				1.0927	1.2950			($7,846)	$0	$0	$5,176			$800	$1,000	$1,800	$7,143	$0	$6,170	6,170
4	0.8227				1.1255	1.4116			($7,846)	$0	$0	$5,642			$800	$1,000	$1,800	$7,668	$0	$6,308	6,308
5	0.7835				1.1593	1.5386			($7,846)	$0	$0	$6,150			$800	$1,000	$1,800	$8,236	$0	$6,453	6,453
6	0.7462				1.1941	1.6771			($7,846)	$0	$0	$6,703			$800	$1,000	$1,800	$8,853	$0	$6,606	6,606
7	0.7107				1.2299	1.8280			($7,846)	$0	$0	$7,307			$800	$1,000	$1,800	$9,520	$0	$6,766	6,766
8	0.6768				1.2668	1.9926			($7,846)	$0	$0	$7,964			$800	$1,000	$1,800	$10,244	$0	$6,934	6,934
9	0.6446				1.3048	2.1719			($7,846)	$0	$0	$8,681			$800	$1,000	$1,800	$11,030	$0	$7,110	7,110
10	0.6139				1.3439	2.3674			($7,846)	$0	$0	$9,462			$800	$1,000	$1,800	$11,881	$0	$7,294	7,294
11	0.5847				1.3842	2.5804			($7,846)	$0	$0	$10,314			$800	$1,000	$1,800	$12,805	$0	$7,487	7,487
12	0.5568				1.4258	2.8127			($7,846)	$0	$0	$11,242			$800	$1,000	$1,800	$13,808	$0	$7,689	7,689
13	0.5303				1.4685	3.0658			($7,846)	$0	$0	$12,254			$800	$1,000	$1,800	$14,897	$0	$7,900	7,900
14	0.5051				1.5126	3.3417			($7,846)	$0	$0	$13,357			$800	$1,000	$1,800	$16,079	$0	$8,121	8,121
15	0.4810				1.5580	3.6425			($7,846)	$0	$0	$14,559			$800	$1,000	$1,800	$17,363	$0	$8,352	8,352
16	0.4581				1.6047	3.9703			($7,846)	$0	$0	$15,869			$800	$1,000	$1,800	$18,758	$0	$8,593	8,593
17	0.4363				1.6528	4.3276			($7,846)	$0	$0	$17,297			$800	$1,000	$1,800	$20,272	$0	$8,845	8,845
18	0.4155				1.7024	4.7171			($7,846)	$0	$0	$18,854			$800	$1,000	$1,800	$21,918	$0	$9,108	9,108
19	0.3957				1.7535	5.1417			($7,846)	$0	$0	$20,551			$800	$1,000	$1,800	$23,707	$0	$9,382	9,382
20	0.3769				1.8061	5.6044			($7,846)	$0	$0	$22,400			$4,000	$0	$4,000	$29,625	$0	$11,165	11,165
21	0.3589	100,000	0	100,000	1.8603	6.1088	186,029	66,774	(12,616)	$0	$0	$24,417			$1,000	$0	$1,000	$26,277	$0	$9,432	76,206
22	0.3418				1.9161	6.6586			(12,616)	$0	$0	$26,614			$1,000	$1,000	$2,000	$30,446	$0	$10,408	10,408
23	0.3256				1.9736	7.2579			(12,616)	$0	$0	$29,009			$1,000	$1,000	$2,000	$32,956	$0	$10,730	10,730
24	0.3101				2.0328	7.9111			(12,616)	$0	$0	$31,620			$1,000	$1,000	$2,000	$35,686	$0	$11,065	11,065
25	0.2953				2.0938	8.6231			(12,616)	$0	$0	$34,466			$1,000	$1,000	$2,000	$38,653	$0	$11,414	11,414
26	0.2812				2.1566	9.3992			(12,616)	$0	$0	$37,568			$1,000	$1,000	$2,000	$41,881	$0	$11,779	11,779
27	0.2678				2.2213	10.2451			(12,616)	$0	$0	$40,949			$1,000	$1,000	$2,000	$45,392	$0	$12,158	12,158
28	0.2551				2.2879	11.1671			(12,616)	$0	$0	$44,634			$1,000	$1,000	$2,000	$49,210	$0	$12,553	12,553
29	0.2429				2.3566	12.1722			(12,616)	$0	$0	$48,651			$1,000	$1,000	$2,000	$53,365	$0	$12,965	12,965
30	0.2314				2.4273	13.2677			(12,616)	$0	$0	$53,030			$1,000	$1,000	$2,000	$57,885	$0	$13,393	13,393
TOTALS		400,000	6,000	406,000			492,029	372,774	($283,084)	$0	$0	$593,486			$29,200	$24,000	$55,200	$685,978	$0	$265,849	632,623

FACS CASE STUDIES

CASE STUDY SUMMARY - HOSPITALS AND HEALTHCARE

1. Ohio Psychiatric & Alcohol Treatment Center
An analysis was made of a new addition versus a renovation. This 72 bed proposed project was part of a 700 bed general hospital with operations of $302 M.

Issue: Are the 4 two-story wings best razed and built new (Plan-1) or renovated (Plan-2)? The "What If" (Plans 1 & 2) were analyzed and factored for least cost combinations of capital and operating - payroll and non-payroll costs.

The capital cost of Plan-1 was $3.25 M. more than Plan-2. The least costly capital plan became the most costly plan to operate.

Results: Plan-1 preferred. This was a least cost combination of capital and operating costs, with:
• $12.9 million present value of savings over 20 years
• $3.2 million more for capital improvements with payback in 8 years
• $430,800 less operating costs initial year

2. Ohio General Hospital
Proposed new addition. This 126 bed hospital required new OR, CCU, ICU and CS departments.

Issue: Is the new addition best located at the rear (Plan-A) or in the front (Plan-B) of the present hospital? Both plans were factored for least cost combinations of capital and operating costs.

Results: Plan-B preferred, with:
• $11.2 million present value of savings over 20 years
• 884 linear feet less corridor with 22 hours less travel time per day shift staff
• 5 nursing stations instead of 6
• 10,280 sq. ft. less heat loss thru roof & walls

FACS CASE STUDIES

CASE STUDY SUMMARY - INDUSTRIAL PLANTS

1. South Carolina Engine Plant Assembly line
The improvement process allowed workers to be responsible for their own work and created a mechanism for requesting improvement assistance and a feedback and closure loop that recognized and built in improvements. The results were:

- 2500 ft. line to 120 ft. line.
- 400 engines in process inventory to 20 in process.
- $2 million in process to $100,000 in process.
- 40% built complete from lineset to 98% built complete (without talking to a supplier).
- Reduction in floor space of 75%.
- Reduction thruput time from 3 weeks to 6 hours.

2. Ohio Crankshaft Plant
In an automotive component business, with sales of $8 million/year the clarification of responsibility and schedules allowed:

- A specific ordering of support functions reducing indirect labor cost 90%.
- A 60% reduction in direct labor.
- Immediate feedback causing variances to be corrected immediately.
- Audit costs reduced by 90%.

Continuous improvement initiatives showed that improvements were best made by those who were closest to the work. Productivity improvements required an exchange of information between management and line employees to enable them to make improvements.

3. Indiana Fuel Pump plant
At a fuel system plant with yearly sales of $40 million, productivity improvement focused on scheduling and clarification of responsibilities by organizing production around customer demand:

- Three of four order documents were eliminated.
- Nine of thirteen productivity measurements were eliminated.
- The clarity of what needed to be managed and what could stop being managed allowed three of five managers to take excess capability into new markets.
- Balanced and synchronized operations allowed for a $2 million reduction in in-process inventory.
- Workers understood the scheduling system and have created a measurement system that directly reflects improvements work.
- Saved $7 million per year in operating expense.
- The space requirements of the new businesses were accommodated in the existing facility due to base business space reduction of 80%.
- In every situation, management of direct labor was simplified. Management changed from managing variances to supporting improvements.

ABOUT US

CADAFIS provides consulting services and software for capital facility asset managers, operations and financial officers of institutions, multi-site businesses and commercial and industrial complexes. Software is also provided to architects, engineers, GASB auditors and associated building industry personnel. CADAFIS has been active since 1995 and was incorporated in 2001. Specific CADAFIS software applications have been developed, including consulting services, for the City of Columbus, OH, the Columbus Public Schools and the State of Ohio. These projects have involved 292 buildings with approximately 8.75 million square feet.

The CADAFIS methodology has evolved over several decades and continues to improve, using advanced planning techniques with computer technology. The three principals of the firm, prior to forming CADAFIS Inc., have been involved collectively with capital facility assessment, design, operational improvements and marketing with approximately 8,000 buildings and 160,000,000 sq. ft.

Samuel Ingwersen, Architect, President, CADAFIS Inc., artist, graduate of Miami University, Oxford, OH, Bachelor of Architecture; Cornell University, Ithaca, N.Y., Master of Architecture. Member of more than a dozen professional associations, past and present. Major Architectural Projects include: Hospitals and Healthcare - 25; Industrial and Commercial - 19; Educational and Libraries - 19; Correctional Facilities - 12; and more than 120 other assorted renovation projects.

Howard Hawks, Vice President of Software Development, CADAFIS Inc. graduate of The Ohio State University, Columbus. OH, B.S. degree in Finance, 20 years Commercial Real Estate experience and Application Development. Developed software for inventory and marketing of over 5,000 industrial buildings, 1,500 office buildings, and 700 shopping centers in four market areas in Philadelphia, Minneapolis, Orlando and Columbus, OH.

John A. Ingwersen, Architect, Vice President of Operations, CADAFIS Inc. graduate of Cornell University, Ithaca, N.Y., Bachelor of Architecture. Member American Institute of Architects, has proven track record leading objective - focused architectural and engineering team projects. Has provided comprehensive architectural and facility services nationwide for a 3 billion dollar commercial real estate business and a 1 billion dollar retail business. Conducted large scale master planning projects for international manufacturers which have involved integration of manufacturing and processes and transforming them into value-added businesses. Projects include:

Deere and Company, Waterloo, IA, Created five year masterplan for 2M sq. ft. tractor assembly plant and reorganized production processes to connect internal customer and supplier business groups.

Miller Electric Manufacturing, Appleton, WI, Designed a masterplan for manufacturing facilities which transformed a traditional function-based operation into integrated product-focused business organizations. Integrated once separate corporate offices as immediate support to value-added business operations.

Cumins Engine Company, Columbus, IN, Designed a masterplan for a fuel pump manufacturing facility including assembly and test workstations, offices and technical resources. Resulted in a 50% reduction in plant footprint and a 32% reduction in per unit cost.

Barry Controls, Burbank, CA, Conducted a masterplan project for management, engineering and manufacturing transformation of traditional aerospace component OEM to a product focused business campus. Successfully refocused the organization into best practice competitive entities, doubling gross margins, reducing space needs by 35% and providing world class customer focus.

CONTACT US

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