

LIFTECH ANALYSIS SUITE (LAS)

The Liftech Analysis Suite is a group of programs to facilitate the analysis and design of container cranes and other complex frame structures.

The programs are designed with a satellite architecture. This means that LSAP, the structural analysis program, can be replaced with other industry programs such as NASTRAN, and that additional pre- and post-processors can be inserted for special applications. For example, to analyze a special structure such as a large dome, you can use CRANEVIEW or develop a new pre-processor to generate the geometry.

LAS ARCHITECTURE

LIFTECH ANALYSIS SUITE

The Liftech Analysis Suite is a group of programs used to analyze and design complex structures. The programs have been continuously developed since 1964 and are now 32-bit Microsoft Windows based.

The programs first assist the engineer in developing ASCII input files for an equation solver. We use LSAP, but other solvers may be used. After the solver is run, the programs assist the engineer in reviewing the results and revising the design.

The engineer may now concentrate on the design at hand and not on the tedious tasks of manually generating input files and reviewing the output data.

INPUT

The input file for the equation solver, LSAP, is generated in parts. The parts that are tedious and time consuming to generate are generated by the programs. The parts that are

simple and take little time to generate are created by the engineer using an appropriate editor. An assemble program assembles the parts into a single ASCII input file.

The equation solver solves the mathematics and produces the usual output files. Some are ASCII and some are binary. The binary files are useful when there is a great deal of data to be used by other programs.

OUTPUT

The output files are processed by programs that make checks useful for quality assurance and determining if the structure meets the design criteria. The post processors calculate stresses for all load cases, check fatigue, calculate plate buckling, check the stability criteria, and produce data that is useful in designing and checking joints.

PROCESSING AND EDITING

After the LSAP run, the preprocessors are used to revise data and assist in generating revised input files. Usually, the original data does not need to be handled again. For example, MLGEN can save the global positions of the moving load. Even if the joints are relocated on trolley runway, the moving load input can be generated without inputting existing data.

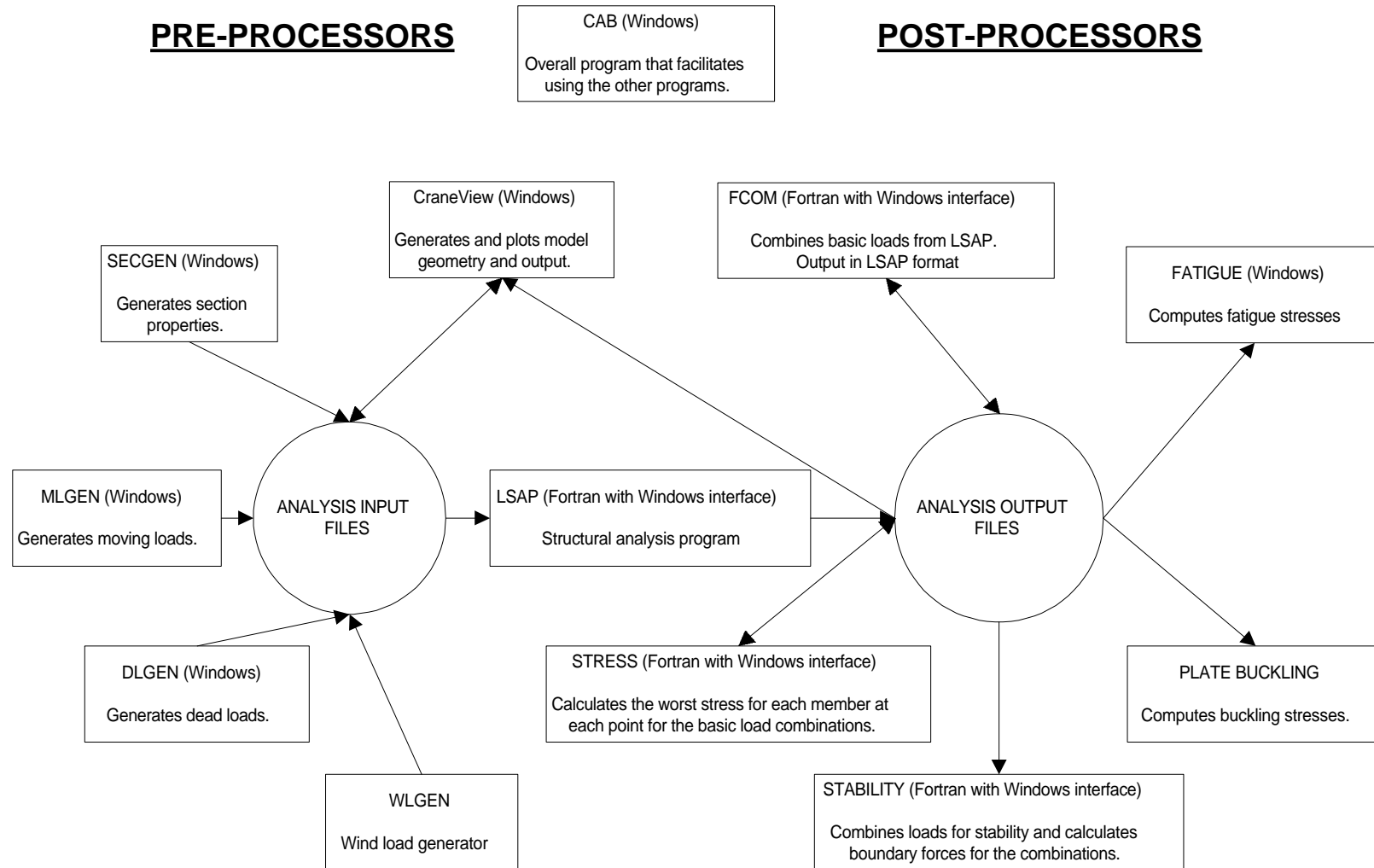
So, the programs stand alone but work together. Each gets data from the user or a file and puts the results in file. The data can be sent through filters that massage the data to suit the next use. Or filters can process the data from an ASCII file to suit the program. This is how the programs can work with different equation solvers and why the use of the programs does not need to follow a standard order. See Figure 1 for a graphical overview.

Some programs, however, have prerequisites. That is, the data needed from files must already be in files. DLGEN, for example, needs to know the geometry, the connectivity, and the areas before calculating the member loads. If the prerequisite files are not available, the programs tells you.

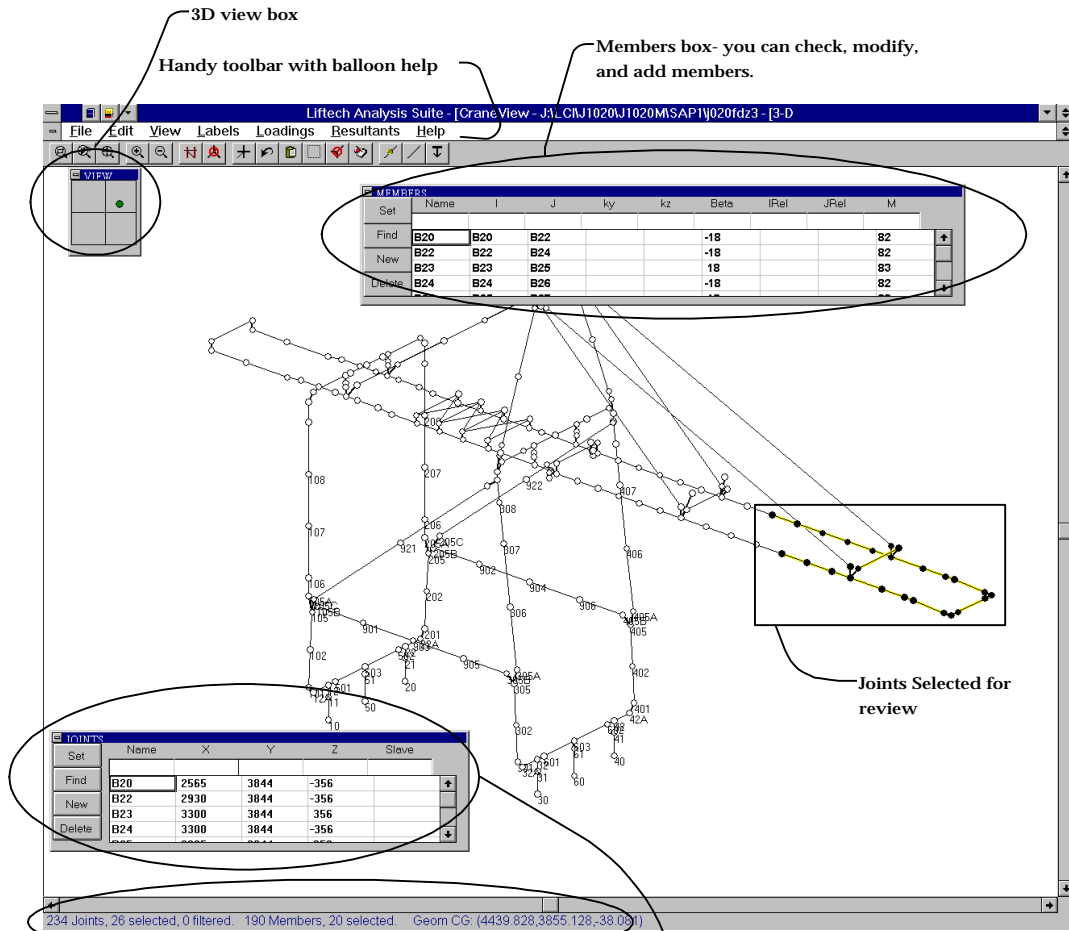
Since the programs are in Windows, all the editing features, such as copy and paste, can be used to transfer data between active programs and files.

The architecture allows efficient and flexible use. A detailed flow chart is not required nor can one be constructed. You will quickly learn how to make the best use of the programs.

FIGURE1 - OVERVIEW OF LIFTECH ANALYSIS SUITE



CRANEVIEW



3D view box

Handy toolbar with balloon help

Members box- you can check, modify, and add members.

Joints Selected for review

The status bar gives very useful information including the x,y,z distance between two nodes.

You can check as many joints at one time as you like. You can also modify multiple joints. For example, if you want to raise the crane 500 cm, select all the joints you want to raise, put 500r in the Y box and select the Set Button.

If you wish, you can copy and paste from and to an external source such as M.S. Excel.

SECGEN

Check the section property of each section instantly

The screenshot displays the SECGEN software interface with three main windows:

- Section Properties - Summary:** A table showing properties for four sections. A callout circle highlights this window with the text "Check the section property of each section instantly".
- Section Sketch:** A graphical representation of a rectangular section with dimensions and coordinate axes.
- Standard Section Editor:** A form for defining a section, currently set to "YBOXS" type and "LLL08_12" name. It includes a table for defining section geometry.
- Section List:** A spreadsheet-like table listing various sections. A callout circle highlights this window with the text "Choose printing and saving for each or all the members. Printing sections or writing them to the input file are just a few mouse clicks away."

	Area	Sy	Sz	Moments of Inertia		
Ax	603.20	1	-37,258.38	-24,376.23	Ix	3,106,638.88
Ay	283.20	2	-37,258.38	24,376.23	Iy	3,725,828.20
As	320.00	3	37,258.38	-24,376.23	Iz	1,457,698.67
		4	37,258.38	24,376.23		

Section #	Type	Name
11	YBOXS	LLL08_12

	A	B	C	D	E	Z
1	2000.0000	8.0000	1180.0000	12.0000	1926.0000	10.0000

	Print	Save	Sec	Type	Name	A	B	C	D	E	F
1			11	YBOXS	LLL08_12	2000.0000	8.0000	1180.0000	12.0000	1926.0000	10
2			12	YBOXS	LLM08_12	2000.0000	8.0000	1307.0000	12.0000	1926.0000	10
3			13	YBOXS	LLM08_08	2000.0000	8.0000	1307.0000	8.0000	1934.0000	10
4			14	YBOXS	LLU08_08	2000.0000	8.0000	1434.0000	8.0000	1934.0000	10
5			15	YBOXS	LSU08_08	2000.0000	8.0000	1184.0000	8.0000	1934.0000	10
6			16	YBOXS	LSU10_12	2000.0000	10.0000	1180.0000	12.0000	1926.0000	10
7			17	YBOXS	LLL10_16	2000.0000	10.0000	1180.0000	16.0000	1926.0000	10
8			18	YBOXS	LLM10_16	2000.0000	10.0000	1307.0000	16.0000	1926.0000	10

Choose printing and saving for each or all the members. Printing sections or writing them to the input file are just a few mouse clicks away.

Container cranes consist of a few common sections with varying plate thicknesses. You enter the data for a predefined section type in the list, eg: Box, Trapezoidal Sections.

The Section List works just like a spreadsheet. For example, if you want to size an entire boom, you can input one section and then copy and paste that section to the other rows. Then you modify the plate thicknesses.

If you want, you can even copy and paste data from other sources such as M.S. Excel.