SYNOPSIS

ILLUSTRATED PROGRAM DATA

Olivetti P602 Microcomputer

This illustrated data has been prepared by Ross H. Bryan Inc.,Consulting Structural Engineers, to acquaint firms in the structural consulting field - who are considering purchase of an Olivetti P602 - with a number of structural programs developed for the machine. The programs are written specifically for the structural design field and contain practical, analytical solutions to design problems.

A list of current programs is included. Package A contains programs that will function on P602 with or without MLU600. Package B is designed for the P602 with MLU600.

Programs can be furnished in several ways -

1. The P602 buyer may send his tape cartridge to Ross H. Bryan Inc. for selected programs. The cartridge will be loaded and returned.

2. The programs may be transferred to magnetic cards, in which case the buyer will pay the additional price of the cards.

3. Ross H. Bryan Inc. will send program instructions on a paper tape. With this method the buyer must key in the instructions.

Several useful features are contained in these programs which are not usually found in programs for small computers. One such item is a preprinted analysis sheet matching up with the tape output. The tape output may be reproduced with the explanatory sheet to supply a complete, understandable record-set of calculations. Complicated programs have a written commentary to help the user in selecting input data items.

The packages include programs to design prestressed, post tensioned, and reinforced concrete members, and concrete columns and footings. There are numerous section properties programs for different steel and concrete shapes, and a general program for any shape. Continuous beam programs, giving moment, shear and deflection, and a composite steel design program are available.

Considerable time and expense would be required for an individual firm to develop in-house information comparable to this structural package. The suggested package gives a purchaser of the Olivetti P602 access to the most comprehensive set of structural programs developed to date for this particular piece of equipment.

The staff of this engineering firm includes two system analyst engineers who have written all programs in the package and are available for specific program writing for those who wish to expand beyond the present listings.

PACKAGE A

These programs require only the P602. The MLU600 is not required although it could be used to store all programs, thus making access easier. The following 20 programs comprise the recommended structural package. The price of this group is $495.00.

4	15	22	34	40
5	16	25	35	41
10	17	26	36	43
12	18	27	39	55

PACKAGE B

Programs listed in Package B require the P602 with MLU600 and, due to their complexity, will be priced individually. Since the P602 with MLU600 is such a recent introduction to the market, this package is not yet completed. Available programs are shown on Pages 1 and 2 of the Package B Index. Page 3 shows programs under development. All purchasers of the current material will be notified when these programs become available.

STRUCTURAL ENGINEERING PACKAGE

BY

ROSS H. BRYAN INC.
CONSULTING ENGINEERS

Third National Bank Building
Nashville, Tennessee 37219

PACKAGE "A"

Olivetti P602

PACKAGE "A"

BRIEF COMPUTER PROGRAM DESCRIPTION FOR OLIVETTI P602

by

ROSS H. BRYAN INC.
Consulting Engineers
Third National Bank Building
Nashville, Tennessee

1. RIGID PILE ANALYSIS

Program computes soil pressures and moment capacity of pile. Also locates maximum moment on pile giving stress at that location.

3. DOUBLE TEE SECTION PROPERTIES

Section properties for double tee are computed for any type double tee. Flange thickness, stem sizes, flange width and member depth are input.

4. CUBIC EQUATION SOLVER

Program solves for three real roots of a cubic equation. Program will not solve for complex roots.

5. DEFLECTION OF A SIMPLE SPAN WITH UNIFORM LOADING AND END MOMENTS

Program computes the deflection at any point within the span length. End moments do not have to be equal. Zero value can be entered for either moment or uniform load, in cases where they are absent.

6. DEFLECTION OF CANTILEVER BEAM WITH POINT LOADS AND A PARTIALLY UNIFORM LOAD

Deflection due to any number of point loads and a partially distributed uniform load are computed independently and then summed.

7. SECTION PROPERTIES FOR A DOUBLE TEE WITH ANY TOPPING THICKNESS

Program requires that section properties of the bare double tee be used in input. This data may be obtained using Program 3.

8. SECTION PROPERTIES FOR A LIN TEE

Area, centroid, inertia and both section moduli are computed.

10. DEFLECTION AT ANY POINT IN A SIMPLE SPAN DUE TO ANY NUMBER OF CONCENTRATED LOADS

Program gives value of deflection at desired point due to each load and then due to all loads acting at the same time.

11. SECTION PROPERTIES FOR STEEL JOIST

Centroid, inertia, and section modulus for a typical steel joist are computed.

12. DESIGN OF VERTICAL, BLOCK, SPREAD, AND CAISSON FOUNDATIONS

Moment capacity is computed for spread, vertical, block and caisson footings. This moment is compared with moment at bottom of footing (output). Soil pressure and safety factor, along with loads on footing, are input.

14. STRESSES IN A PRESTRESSED BEAM AT RELEASE

Program computes the stresses in the top and bottom of a prestressed beam at the ends and midspan at release.

15. INTERACTION DIAGRAM FOR COLUMN DESIGN BASED ON ULTIMATE

Program computes P_b and then enters a loop which allows the user to enter the area of steel to be used and P_o, M_b, and M_o are computed and printed out for this amount of steel. Another area of steel may be entered with P_o, M_b and M_o computed repeatedly until all desirable areas of steel have been inspected.

16. STIRRUP SPACING FOR CONVENTIONAL BEAM BASED ON WORKING STRESS (UNIFORMLY LOADED BEAM, ONE SPAN)

The value of the beam shear at a distance "d" from the support is entered as a beginning value for computations. Program continues giving required stirrups in one foot increments until the actual beam shear can be carried by the beam.

17. STIRRUP SPACING FOR ONE SPAN BEAM BASED ON ULTIMATE STRENGTH

Required stirrup spacing is given in one foot increments across the span. Program is written to solve for stirrup spacing for beam with or without external moments and uniform loading condition.

18. PRESTRESSED BEAM DESIGN

Program solves for stresses due to member weight, topping weight, live load, initial prestress and final prestress. Required number of strands based on ultimate and allowable stress conditions is computed.

20. SECTION PROPERTIES FOR A DOUBLE TEE WITH AREA OF STEEL CONSIDERED

Program transposes the reinforcing steel into an equivalent area of concrete and then computes the section properties.

22. SECTION PROPERTIES FOR A SECTION THAT CAN BE REDUCED TO A SERIES OF RECTANGLES

Width, height and centroid for each rectangle is entered as data. Program computes y_b, inertia, and section modulus for a section composed of any number of rectangles.

23. SECTION PROPERTIES FOR A LEDGER BEAM

Input data modification allows versatile usage from this program. Inverted tee sections and normal tee section can be handled in most cases.

25. REACTIONS FOR A SIMPLE BEAM WITH EXTERNAL APPLIED MOMENTS, A UNIFORM LOAD, AND ANY NUMBER OF CONCENTRATED LOADS.

Program will work if any of the above mentioned loads are zero. Left and right vertical reaction are computed for the combination of loads present.

26. MOMENT DIAGRAM ORDINATES FOR SIMPLE SPAN BEAM WITH A UNIFORM LOAD AND ANY NUMBER OF CONCENTRATED LOADS

Simple beam may have external moments applied at the support. Moment diagram ordinate computed and printed out in one foot increments starting at the left side of the beam.

27. COMPOSITE BEAM DESIGN

Program computes all calculations as shown on Pages 2 - 146 and 2 - 147 of the AISC Steel Manual, 7th Edition.

29. REACTIONS FOR SIMPLE BEAM WITH PARTIAL UNIFORM LOAD

Program computes reactions, maximum moment and the location of the maximum moment.

30. INDETERMINATE TWO SPAN BEAM WITH CANTILEVER

Fixed end moments and cantilever moment are the required input. Also length of regular spans (excluding cantilever) are entered. Moment distribution is the method of analysis used to solve for the negative moment.

31. REACTIONS AND MOMENTS FOR A BEAM FIXED AT ONE END AND PINNED AT THE OTHER WITH A PARTIAL UNIFORM LOAD

Reactions and moment value are computed and printed.

32. FIXED END MOMENTS FOR A BEAM WITH A PARTIAL UNIFORM LOAD

Fixed end moment at each end of the beam is computed and printed.

33. FIXED END MOMENTS FOR A BEAM WITH A UNIFORMLY VARYING LOAD PARTIALLY DISTRIBUTED

Reactions and moments are computed for this loading.

34. INDETERMINATE TWO SPAN BEAM SOLUTION BY MOMENT DISTRIBUTION

Modified stiffness factor used by program. Span lengths and fixed end moment are part of input. Negative moment at middle support is computed.

35. INDETERMINATE THREE SPAN BEAM SOLUTION BY MOMENT DISTRIBUTION

Span lengths and fixed end moments are the required input. Modified stiffness procedure used.

36. INDETERMINATE FOUR SPAN SOLUTION BY MOMENT DISTRIBUTION

Span lengths and fixed end moments are required input. The negative moment at each interior support is computed.

38. SOLUTION TO A QUADRATIC EQUATION, FOR EXAMPLE: $5(Kd)^2 - 3(Kd) + 8 = 0$ PROGRAM GIVES TWO VALUES OF Kd AS ANSWERS

Three coefficients are required input with both roots computed and printed out as answers.

39. SOLUTION OF BEAM WITH EXTERNAL MOMENTS APPLIED AND ALSO LOADED UNIFORMLY. GIVES REACTIONS AND MAXIMUM POSITIVE MOMENT.

Both beam reactions and the maximum positive moment with its location are the output for this program.

40. FIXED END MOMENTS FOR BEAM WITH BOTH ENDS FIXED AND ALSO FOR A BEAM WITH ONE END FIXED AND THE OTHER END PINNED

Full uniform load and any number of concentrated loads are considered by the program. Output used on Programs 34, 35 and 36.

41. DEFLECTION OF A PRESTRESSED BEAM

Deflection due to member's weight, prestress, superimposed load, and live load is computed. Camber is calculated assuming a 1.5 growth factor. This value can be modified to any value desired.

42. FIXED END MOMENT AND REACTIONS FOR BEAM PINNED AT ONE END AND FIXED AT OTHER WITH A UNIFORMLY VARYING LOAD PARTIALLY DISTRIBUTED

Zero point of load is on pinned side of beam and maximum point of load is on fixed end of beam.

43. TWO SPAN BEAM ANALYSIS AND DESIGN

Program is based on ultimate stress criteria. Uniform load is assumed acting on beam. Fixed end moments, negative moment, reactions, maximum positive moments and their locations are computed and printed. Area of steel required at midspan and at the middle support is calculated and printed.

45. SECTION PROPERTIES FOR A SECTION BUILT-UP OUT OF PLATES

Inertia and section modulus are computed with respect to both axis, x and y. Sections considered by program are box or I-beam section.

46. Kd AND INERTIA FOR A CONCRETE BEAM CONSIDERING A CRACKED SECTION

Program assumes beam is a cracked section. Reference should be made to the ACI Code, Section 909c to determine if a particular section is cracked.

47. BOND STRESS BASED ON WORKING STRESS

Program computes the bond stress for a group of bars, mixed or identical. Working stress analysis as outlined in the ACI Building Code is followed. Allowable bond stress for top and bottom bars is computed and printed.

48. CONCRETE BEAM DESIGN - GIVES AREA OF STEEL REQUIRED AT EACH LOCATION WHERE MOMENT IS KNOWN

Program is based on Ultimate Strength analysis. Beam width and bending moment are entered at each section where area of required steel is desired.

49. SECTION PROPERTIES FOR ROLLED SHAPE WITH ONE PLATE ADDED

Area, centroid, moment of inertia, section modulus with reference to base, and radius of gyration are computed by this program.

50. DEFLECTIONS FOR UNIFORMLY LOADED SIMPLE BEAM WITH CANTILEVER END

Deflection at cantilever end is computed and printed. Program computes the deflection at any desired point between the supports. After the location where deflection is desired is entered, the machine computes the deflection and prints it out. As many locations as desired may be inspected with only one execution due to the cycle built into program. Program will also work for uniformly loaded beams without the cantilever ends.

51. DEFLECTION AT THE END OF A CANTILEVER BEAM WITH THREE INERTIA CHANGES

Uniform load is assumed to be acting on the first two segments of different inertia. The extreme segment representing the third inertia must also have a uniform load, although it can be a different magnitude from the initial two segments.

53. REACTIONS AND INTERNAL MOMENTS FOR A BEAM WITH APPLIED END MOMENTS AND ANY NUMBER OF POINT LOADS

For each point load, the moment diagram ordinate is given at the location of the load. Superposition may be used to get final moment diagram. Reactions are given for the total beam load.

54. SECTION PROPERTIES OF ROLLED SECTION WITH PLATE ON ONE SIDE

Section properties are computed about both axis. Torsion constant is also computed.

55. CONCRETE BEAM CAPACITY AND STEEL REQUIREMENTS BASED ON ULTIMATE STRESS ANALYSIS

Program first computes the ultimate moment the section can carry and then enters a loop that allows the user to obtain required steel areas for each moment in the beam without going back to the beginning point or entering the card again.

56. ANALYSIS AND DESIGN OF CONCRETE WALL WHERE LOAD VARIES UNIFORMLY

Program assumes pinned end conditions with a full triangular load. Reactions, maximum moment, and area of steel required for this moment are part of output.

57. ANALYSIS AND DESIGN OF CONCRETE WALL WHERE LOAD VARIES UNIFORMLY AND IS PARTIALLY DISTRIBUTED

Reactions and maximum moment are printed out.

58. SECTION PROPERTIES FOR A TEE SECTION

Example: Pan Construction - centroid, area, inertia and section modulus are output.

64. SECTION PROPERTIES FOR STANDARD ROLLED SHAPE WITH TWO PLATES ADDED

Plates can be different sizes in the analysis. An example would be a wide flange section with a 5 x 3/4 plate added to the top flange and a 9 x 1/2 plate added to the bottom flange.

65. SECTION PROPERTIES OF ROLLED SECTION WITH TWO PLATES ADDED

Plates are added to the side of the section. Section properties about both axis are computed.

66. ROTATION AND DEFLECTION ANALYSIS

Rotation and deflection is computed at load point due to external moment and point load.

67. SOCKET DEPTH DESIGN

Required socket depth is computed for section with applied moment and shear. Added plate thickness also computed.

73. FIXED END MOMENTS AND REACTIONS FOR BEAM PINNED AT ONE END AND FIXED AT OTHER, WITH A UNIFORMLY VARYING LOAD PARTIALLY DISTRIBUTED

Zero point of load is on fixed side of beam and maximum point of load on pinned end of beam.

74. REACTION, MOMENT AND STRESS FOR BEAM LOADED SYMMETRICALLY

Two equal point loads with a uniform load are considered. Loads must be symmetrical about centerline.

75. SECTION PROPERTIES OF BOX SECTION ABOUT BOTH AXIS

Inertia and section modulus about x and y axis are computed. Also polar moment of inertia is calculated.

124. REACTIONS AND INTERNAL MOMENT FOR BEAM WITH END MOMENTS AND A CONSTANTLY VARYING UNIFORM LOAD

The end moments may be zero or different. Location of desired moment is entered.

STRUCTURAL ENGINEERING PACKAGE

BY

ROSS H. BRYAN INC.
CONSULTING ENGINEERS

Third National Bank Building
Nashville, Tennessee 37219

PACKAGE "B"

Olivetti P602 with MLU600

BRIEF COMPUTER PROGRAM DESCRIPTION
FOR OLIVETTI P602 with MLU600

by

ROSS H. BRYAN INC.
Consulting Engineers
Third National Bank Building
Nashville, Tennessee

SPREAD FOOTING DESIGN

59. Complete design is performed for footing with axial load and moment. Three different sets of equations are built into the program so that any type soil pressure distribution can be handled. Moment capacities based on allowable soil pressure and safety factor against overturning are output along with actual moment at bottom of footing. Beam and punching shearing stresses are output with allowable stresses from ACI Code 318-71. Finally, flexural stresses, moments and area of steel required for top and bottom are output. ($85.00)

PRESTRESSED CONCRETE MEMBER DESIGN

83. Dead, superimposed and live loads are entered. Member can have cantilever on both ends. Moments are computed and stored for use in No. 86. Option is built into program to allow user the ability to handle point loads in design. (85.00)

86. Initial and final stresses are output for top and bottom of member. Tendon profile can be straight, have one point depression, or two point depression. ($85.00)

89. Stirrup requirements for prestressed beams, based on short method of ACI 318-71 Code. ($50.00)

POST TENSIONING CONCRETE DESIGN

95. Stresses at end of member and midspan due to DL + post tensioning and due to DL + LL + post tensioning. ($125.00)

98. Strand location for end span when cable has three parabolas pattern. Cable eccentricity is output for each X value entered along beam. ($50.00)

Post Tensioning Concrete Design - Continued

100. Strand location for interior span when cable has four parabolas pattern. Program computes eccentricity for any location in span. ($50.00)

104. Effective post tensioning force at each support is computed for any number of spans. Loss computations are same as ACI 318-71 Code recommends. Wobble factor and friction coefficient given in Code are part of input. ($75.00)

125. Fixed end moments are computed for a post tensioned, non-concordant drape exterior span. Program gives equivalent uniform load that would produce this moment for pinned, fixed beam. ($75.00)

126. Fixed end moments are computed for a post tensioned, non-concordant drape interior span. Program gives value of point load and location that would produce same moments. ($75.00)

CONTINUOUS BEAM ANALYSIS

127. Program computes negative moments for any number of continuous beams up to a maximum of ten spans. Each member's loads, length and inertia are required input. If point loads are present, the location of each load must be specified. Any number of point loads may be present on each span. After negative moments are written out on paper tape, they are stored internally along with most of the input data, all of which can be used later in No. 143 and No. 163. Program No. 143 is designed for members with only uniform loads present, while No. 163 is for members with uniform and point loads. ($125.00)

143. This program is used when all members analyzed in No. 127 were uniformly loaded only. It solves for reactions, maximum positive moment, location of moment and midspan deflection. Shear and moment diagram for each span can be written out if desired by user. Member length is divided into ten segments for this option. When the shear and moment diagrams are output, these values are also stored on the MLU tape unit. ($50.00)

Continuous Beam Analysis - Continued

163. This program works when point loads are present on all or some spans of the continuous beam analyzed by No. 127. Program computes shear and moment diagram for member divided into ten segments. Reactions are part of this output. All shears and moments are stored internally on MLU tape unit. Complete concrete and steel design programs are currently under development. These programs will read shears and moments from the tape and design the members. ($50.00)

****

PROGRAMS PRESENTLY UNDER DEVELOPMENT

1. Steel and Concrete Design Program
2. Retaining Wall Design
3. Tabular Column Load Analysis for Multi-Story Building
4. Concrete Shear Wall Analysis
5. Prestress Stirrup Requirements (Long Method, Section 11.5.2, ACI Code)
6. Prestress Deflection Analysis (18.4.2c, ACI Code)
7. Wind Force on Multi-Story Building by Cantilever Method
8. Steel Truss Analysis
9. Concrete Tee Beam Design
10. Circular Concrete Column Design
11. Steel Base Plate Design