

Company Profile

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WITCH PIPE SUSPENSION EQUIPMENT

May2004

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INTRODUCTION

Carpenter & Paterson Limited are specialists in the design and manufacture of Pipe Suspension Equipment and Steelwork Fabrications.

The company was established in 1956, and has since developed into Europe's largest manufacturer of PIPE SUPPORT SYSTEMS for the Power Generation, Oil, Gas, Petrochemical, Process and Allied Industries.

Additionally, Carpenter & Paterson provides extensive Engineering, Design and Analysis Services to supplement various clients in-house capabilities.

This Overview of Capabilities has been prepared to present the products and services offered by Carpenter & Paterson, and summarises capabilities that stand unique within the Piping Industry.

MARKETS

Carpenter & Paterson is a leading company involved with the Design, Stress Analysis and Manufacture of Pipe Support Systems for the following industries:-

**POWER
GENERATION**

**PETRO-
CHEMICAL**

OIL & GAS

NUCLEAR

STEEL

**PROCESS
PLANT**

**OFFICE LOCATION
MAP**



SECTION 1 - CORPORATE DETAILS

- 1.1 Company Title: Carpenter & Paterson Limited
- Address: Crown Works
 Welshpool
 Powys SY21 7BQ
 United Kingdom
- Telephone No: + 44 (0) 1938 552061
 Facsimile No: + 44 (0) 1938 555306/552818
- 1.2 Company Contacts: J S Lee - Chairman
 J A Lee - Managing Director
 R Macdonald - Sales Director
 N Spiers - Engineering Manager
 K Edwards - Financial Controller
 D B Davies - Quality Assurance Manager
 E Woosnam - Shipping Manager
- 1.3 Type of Company: Private Limited
- 1.4 Country of Registration: United Kingdom
 Registration No: 559771
- 1.5 Date Established: 7 January 1956
- 1.6 Company Business: Carpenter & Paterson are specialists in the design and manufacture of Pipe Suspension Equipment and Fabricated Steelwork. Our comprehensive service includes the supply of a wide range of standard pipe support components. Facilities exist for the design and supply of special pipe support fabrications and equipment in a wide range of materials and surface finishes to suit the customer's specific requirement.

COMPONENTS

- . Constant Load Hangers and Supports
- . Variable Load Hangers and Supports
- . Hydraulic Shock Arrestors
- . Mechanical Shock Arrestors
- . Sway Braces
- . Rigid High Stiffness Struts
- . High Stiffness Pipe Clamps
- . Pipe Whip Restraints
- . Ancillary Equipment
 - Pipe Clamps
 - Rods
 - Beam Attachments
 - Rollers and Sliders
 - Guides
 - Anchors, etc.
- . Structural Steel Fabrications
- . Corrosion Resistant Supports
- . Cryogenic Supports
- . PTFE Slide Supports
- . Witchliner Isolation Products

SERVICES

- . Design and Detail of Complete Pipe Support Systems
- . Pipework Stress Analysis
- . Comprehensive Site Inspections and Surveys
- . Design Reviews
- . Vibration Control and Suppression
- . Project Management

SOFTWARE

- . “Witch-Hanger 4” Graphical Pipe Support Design Program
(available free of charge)
(Windows Version)

SECTION 2 - PRODUCTS

2.1 Constant Effort Units

The Constant Support designed and manufactured by Carpenter & Paterson incorporates the latest design concepts, resulting in a constant supporting effort through the total travel of the unit. The simplified construction, together with the established principle of a compression spring working in conjunction with a bell crank lever, achieves a mathematically perfect counter-balancing of spring and load moments about the main pivot point.

The design incorporates as standard a device for in situ load adjustment of plus or minus 20% of the set load. This adjustment does not reduce the travel range. The Constants are manufactured to have a maximum deviation of 5% from the set load unless a lower figure is requested at enquiry stage. Upper and lower travel stops are incorporated in all units to prevent excessive overtravel.

Pipe Hanger Range: Loads upto 350,000 N (35,000kg), travel range up to 600 mm.

Specialist Constant Supports are designed to suit customer's specific requirements.



The photograph on the left shows a selection of high quality Constant Supports manufactured for use in a Power Station in Singapore.

2.2 Variable Spring Supports

Our Variable Load Hanger and Supports are available in four travel ranges - 35, 70, 140 and 210 mm, with a load range of 200 N (20 kg) to 250,000 N (25,000 kg). The unique construction of the unit is particularly advantageous for use in severe corrosive conditions.

Special Variable Supports are designed to suit customer's specific requirements.



The photograph on the right shows a Variable Spring Unit Type 'F', within special sliding support

2.3 Hydraulic Shock Arrestors

This range of hydraulic shock arrestor has been developed to protect pipelines and equipment from the effect of shock loads generated by rapid valve closure and/or seismic shock conditions.

Our hydraulic shock arrestors are available in loads up to 6,000,000 N (600,000 kg) and travels up to 450 mm. The Shock Arrestor offered is of the Velocity Limiting type.

Special design shock arrestors are available for extreme loads.

2.4 Mechanical Shock Arrestors

The Mechanical Shock Arrestor has been specifically designed for use in PWR and BWR reactor systems to protect pipework and equipment from the effects of shock loads generated by rapid valve closure and/or seismic shock conditions. The device, unlike most mechanical shock arrestors, is of the velocity limiting type having characteristics similar to a hydraulic shock arrestor.

The Shock Arrestor is available in loads up to 567,000 N (56,700 kg) and travels up to 150 mm. Longer travel units are available by special order.



The picture on the left shows a typical Mechanical Shock Arrestor

2.5 High Stiffness Struts and Clamps

This range of struts and clamps has been designed to meet the stringent criteria required by the PWR and BWR pipework systems. The stiffness of these components has been derived by dynamic testing to ensure full code/customer specification compliance.



Photograph of type 'A' Variable Spring Assembly and Rigid Strut / Yoke Clamp

2.6 Structural Steelwork

We manufacture a wide range of fabrications in carbon, alloy and stainless steel from small pipe sliders to complex structures.

2.7 Ancillary Equipment

A comprehensive range of standard ancillary components is offered including various types of threaded hanger rods, pipe clamps, beam clips, U bolts and many other standard items.

Special design pipe and riser clamps, attachments and connections to meet unusual design conditions or when design parameters exceed catalogued product capabilities are available.

2.8 Pipe Whip Restraints

Multiple U Bar devices and laminated strap devices are engineered and manufactured to meet requirements of Pipe Whip criteria for postulated pipe failure conditions. Special design for fabricated restraint devices and structural elements for major equipment restraint applicable are also available.

2.9 Fabrications

Large structural frames, trimmer steelwork, brackets and special purpose fabricated assemblies, anchors and fabricated restraints, stainless steel and low alloy fabricated supports and restraints.



Carpenter & Paterson Ltd were contracted as the main supplier of the support assemblies required for the Euro Tunnel project between Britain and France.

The photograph on the left shows some of our supports after installation in the tunnel.

2.10 Cryogenic Supports

Carpenter & Paterson are suppliers of cold insulated pipe supports in high-density monolithically moulded rigid urethane foam (PUF). “Thermafoam” is specially formulated and moulded in single and multilayer constructions with high-density skins to ensure correct fit and functioning.

Thermafoam is tested under load and cryogenic conditions. It has an extremely low conductivity factor (K-factor) at cryogenic temperatures and is available in different densities and compressive strengths to accommodate loadings.

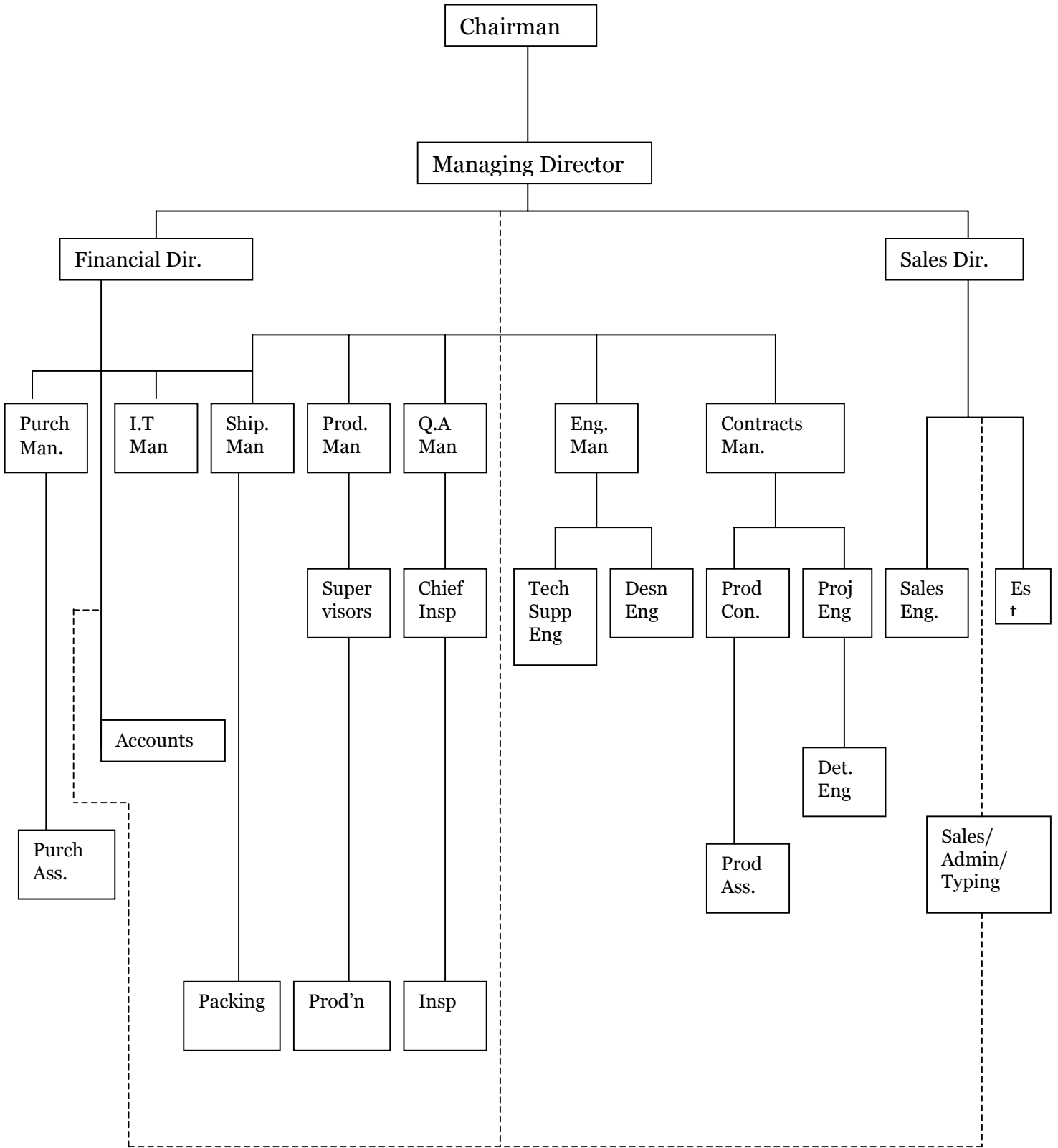
Nominal densities are : 160Kg/M³
 : 224Kg/M³
 : 320Kg/M³

Thermafoam pre-insulated pipe supports have a factory applied vapour barrier and protection shield to ensure a perfect interface with line insulation. The supports are shipped to the job site as complete units for easy installation by the contractor.



The picture on the left shows a type P.U.F Support that was supplied as part of a large contract for a Chemical Plant in the Netherlands

SECTION 3 – COMPANY STRUCTURE



SECTION 4 – MANUFACTURING, SOFTWARE & DELIVERY PERIODS

4.1 Site Area: 12,500 Square Meters
Workshop: 7,700 Square Meters
Access Limitations: None

4.2 Manufacturing and Design Capability including reference to relevant design codes:-
A.S.M.E. III Subsection N.F. 1, 2, 3 and M.C. (Nuclear Power Plant Components).

B.S. 3974 Parts 1, 2 and 3 - Pipe Supports

A.N.S.I. B31.1 (Power Piping)

A.N.S.I. B31.3 (Petroleum Refinery Piping)

MSS SP-58 (Pipe Hangers and Supports - Material and Design)

MSS SP-69 (Pipe Hangers and Supports - Selection and Application)

4.3 Production Staff

Supervisors	4
Inspection	4
Maintenance	2
Production	80
Total	90
(Overall Total employees)	125

4.4 Output Capacity

200 tonnes per month
Constant Springs – 200 per month
Variable Springs – 600 per month

4.5 Construction Material

Carbon Steel
Alloy Steel
Stainless Steel

4.6 Planning Techniques

- a) Computer Aided Stock Control
- b) Computer Aided Planning and Workshop Loading
- c) Computer Aided Work in Progress Evaluation
- d) Computer Aided Departmental Expediting and Customer Progressing

4.7 Computerised Systems

Mission Fileserve Running Novell Ver 3.11

4.7.1	Omicron Multi-user	Sales Ledger Purchase Ledger Nominal Ledger Payroll Ledger
4.7.2	Complete Data Base Management	In-house programmes run under Clipper
4.7.3	Word Processing	Word 97
4.7.4	Spreadsheets	Lotus 123/Supercalc

4.8 As you may see from our catalogue, we have a very wide range of components available from large spring units to U Bolts and steelwork fabrications. We carry extensive stocks of component supports, and these are available immediately direct from our works. All constant and variable spring units are assembled on site to suit the unique loads and deflections advised to ourselves. We advise that we also carry extensive stocks of the component items required for the assembly of the spring units. Over the last 15 years there has been a large amount of oil and gas work in the Norwegian and North Sea sectors, and approximately 85% of all platforms utilise Carpenter & Paterson spring supports. With this in mind it has been necessary to have a flexible and fastrack approach to urgent requirements on site. We are therefore able to complete the spring support units in 2 / 3 days ex-works, but often on large projects we will have an upfront project meeting to discuss all requirements of the program, quality plans and all other relevant details. Because of our computerised progress program we are able to give exact details of the situation on any order at any time.

SECTION 5 – “WITCH-HANGER 4” PIPE SUPPORT DESIGN
PROGRAM
(Windows Version)

program

WITCH – HANGER 4

version 4.0

Summary

After two years of development and encouraging feedback from our customers we are now in a position to release an evaluation copy of our Windows® version of the Witch hanger program.

In-keeping with previous versions it is easy to use and packed with new features to ease the design of support assemblies.

New features

1. All operations performed from a Single Design Screen.
2. Inclusion of ‘Typical’ supports assemblies.
3. Long travel constants selection added.
4. Ability to select ‘Heavy Series’ pipe clamps for small loadings.
5. ‘G’ type constants added. (“Trapeze” Type)
6. More output choice when exporting to DXF files.
7. Extra ancillary items – fig 401/302/600 range.
8. Type ‘H’ & ‘K’ variables added.
9. Ability to change from one type of support to another without leaving drawing screen.
10. Facility to open the last database file used.
11. Facility to change ‘X’, ‘Y’ & ‘Z’ plains.
12. Loading & support information is now on drawing screen.
13. Thumb nail sketch on ‘re-loading of existing support’.
14. Cu pipe sizes added & pipe clamp range increased.
15. Support listing has additional information & the ability to ‘stay on top’.
16. Measure facility added.
17. “Error” message window now lists all errors until cleared.
18. Support settings – minimum rod dia on rigids and set minimum rod length
19. Speed menu for selecting drawing tools.
20. Compatible with Windows 9x, Windows NT

SECTION 6 - QUALITY ASSURANCE

- 6.1 Carpenter & Paterson's documented Quality Assurance and Quality Control Manuals are constantly in use and are based on the requirements of ISO 9001.

All incoming materials are subject to receiving control by the Quality Assurance Department, and comprehensive material traceability is a standard function of our Quality Control Procedures.

The Quality system ensures full compliance with customer's orders and has been successfully audited by a number of major support users. Copies of the Quality Assurance Manual are available upon request.

- 6.2 Designated Responsibility for the Company's Quality Assurance System

Name : D B Davies
Title : Quality Assurance Manager

Responsibility for Inspection is separate from production.

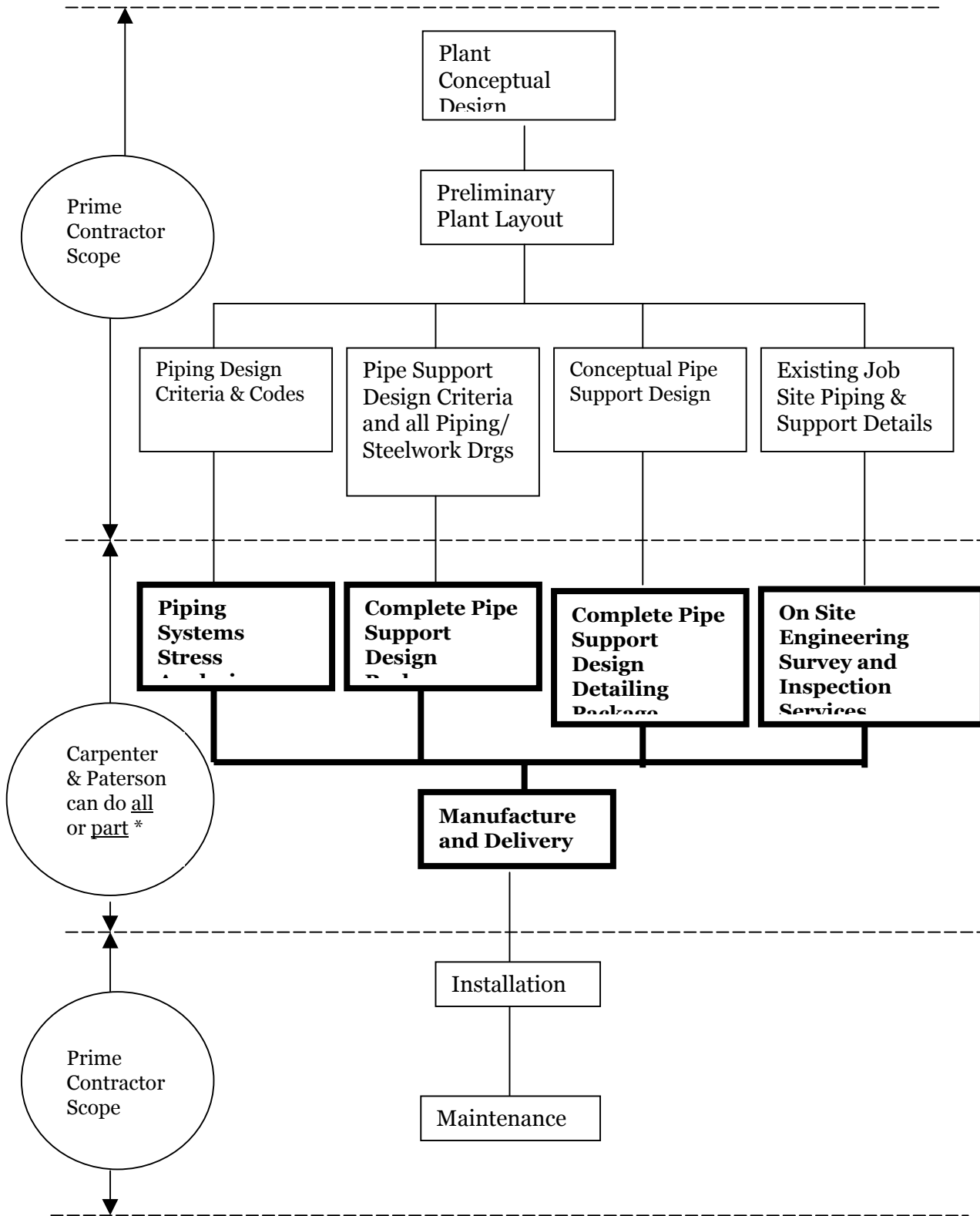
- 6.3 The following Inspection systems operate:-

- 6.3.1 In Process (Stage) Inspection
- 6.3.2 Final Inspection
- 6.3.3 Both In-progress and Final Inspection

- 6.4 N.D.E. Processes are in use

- 6.4.1 Ultrasonic
- 6.4.2 Magnetic Particle
- 6.4.3 Dye Penetrant

SECTION 7 - ENGINEERING SERVICES



* Based on requirements of Prime Contractor

SECTION 8 COST EFFECTIVENESS & FAX INFORMATION SHEET

8.1 Price

- ◆ Continuous commitment to reducing costs
- ◆ Use of 'Frame Agreements'
- ◆ No extras

8.2 Scope of Supply

- ◆ Extensive range of standard items
- ◆ Large quantities of stock material
- ◆ Manufacture to client design specifications, non standard supports and steelwork fabrications

8.3 Quality

- ◆ Accreditation to ISO 9001
- ◆ Comprehensive in-house inspection, resulting in cost saving on site

8.4 Technical Specification

- ◆ Components designed and supplied to National & International standards
- ◆ Complete pipe supports package including design, detail, manufacture and on site technical supervision

8.5 Installation Savings

- ◆ Pre-assembled components on assemblies
- ◆ Wide choice of steelwork connections
- ◆ Efficient use of materials

8.6 Surface Protection

- ◆ In-house facilities for coating of multi-layer paint systems

8.7 Design Facilities

- ◆ Pipework stress analysis
- ◆ Design and detail of pipe support systems
- ◆ Design revisions
- ◆ On site surveys

8.8 Technical Assistance

- ◆ Assistance with design problems
- ◆ Inspection of supports on existing installations

8.9 Computer Systems

- ◆ Comprehensive bespoke software for material breakdown, order processing, stock control, Work In Progress
- ◆ Computer Aided Design (CAD)
- ◆ 'Witch-Hanger 4 Windows' pipe support design software

8.10 Commitments

- ◆ Customer Service
- ◆ Technical Backup
- ◆ Quality
- ◆ Flexibility
- ◆ Professional Approach
- ◆ Value for Money