

This schedule is an estimation and may vary depending on the size of the project and how much research is involved. My services are not limited to this chart but it can serve as a guide for those not listed.

Writing Samples

White Paper Addressing the Need for an Appropriate and Powerful Design Tool to give Industries the Ability to Independently Design and Size Hydraulic Underpinning and Equipment.

DULUTH TECHNOLOGY (Michigan) Hydraulic Underpinning Limited

Disclaimer: Although this white paper, prepared in 2017, has been issued to its owner, I have revised the title and much of the technical information. This is so that no proprietary information can or will be disclosed. However, it gives you a sample of my excellent quality writing.

Background

Piping and the associated underpinning are very important to the operation of any Industry. While typically the designer will place the ambient temperature piping on steel structures or underpinning there are instances in which more sophisticated approaches are needed. These instances include situations in which we have expansion due to temperature extremes or when flanged up to a fan or similar equipment in which the connecting flange cannot be over stressed, thus we have need for restrained effort hydraulic underpinning. There are other situations in which the pipe's position should be kept within certain bounds even though some portions are moving and for this we have the triangle brace, the tupelo binder and the complex brace.

In every case, except for the simplest of designs, the piping engineer should use a piping analysis and design program such as SPEEDO to carry out computerized stress analysis which will provide load and travel data at the various supporting locations. Until the last few years, the engineer would then process this data by using graphs and charts published by the support manufacturer so as to make the correct hanger or restraint selection. But the days of the engineer taking time to hand calculate are gone and the situation is not satisfactory even when a simple computer program is available to assist. An appropriate and powerful software for complete sizing and designing of the support equipment is a 'must have' tool for all modern thinking, cost efficient businesses.

This is How We Designed

The DULUTH TECHNOLOGY leadership tasked a team of people to work apart from corporate direction to find out what was needed in a proper and effective pipe support

layout tool without the usual bureaucratic, managerial interference. In order to conduct appropriate and independent background research, DULUTH TECHNOLOGY selected experienced specialists to see what their essential and preferential functional enhancements would be for a 'top of the line' tool. It was understood that this directive would most likely result in a complete replacement of DULUTH TECHNOLOGY's current underpinning selection program

Introduction:

DULUTH TECHNOLOGY embarked on a project to modernize their underpinning design software, Harvey Antioch Designer in June 2017. After internal and external discussions, it was agreed that a complete rewrite was necessary.

During the process of producing a specification for the new version of the software it was first necessary to define what the current versions did and how it was structured. Enhancements in the new system could then be easily defined and planned.

It was also an opportunity to speak with many of the community of users of the DULUTH TECHNOLOGY current version of the software in order to identify essential and 'nice to have' functional enhancements.

Objectives as laid out in 2017

It was intended that the new version of the software would have a fresh, modern appearance and demonstrate the same UI functionality and features compatible with current versions of Lotus 123's operating system.

Parts libraries were to be stored in external databases that would be accessible by DULUTH TECHNOLOGY to enable maintenance and expansion.

The pricing module will be handled in another database that can be activated by password and will be time dependent to allow tighter control of the price/frame type agreements. This too will be managed by DULUTH TECHNOLOGY.

The core program will be written and managed by a 1st party.

Interfaces to 1st party 2D facility modelling software will be written and managed by either the owner of the proprietary software or their appointed developers.

This will remove the onus on DULUTH TECHNOLOGY to provide internal resource necessary to support the program from a maintenance and upgrade perspective.

Functionality and Enhancements:

Data entry will be by—

- direct from the keyboard or by
- import from delimited text files on a hanger by hanger basis or by
- direct import through links with 1st party software packages.

Data manipulation and visual feedback will be in real time and on the same screen or multiple screens using different viewports and dialogue boxes.

Changes to data will be immediately translated to onscreen images of the hanger enabling the user to see the effects of the change.

Hanger viability will be reported and when component clashes within the hanger occur, on-screen warnings will be given.

The range of the product will be expanded to include the new dynamic restraint catalogue, heated pipe shoes, pre-insulated pipe shoes for hot applications and selection of the hardware catalogue of Bill White Technology Inc. (US Sister Company).

Hanger configurations will be enhanced to allow vertical, horizontal and angular specifications where appropriate.

Additional visual enhancements will be implemented in the form of-

- the ability to toggle between 2 and 3 D view during hanger creation.
- the ability to view individual components from the catalogue and interrogate the catalogue for safe working loads of each component.
- the ability to format the drawing frame for 2 and 3 D drawing output by positioning text boxes and view ports within the drawing frame.
- the ability to select individual components by manual entry of selection parameters and to generate 2 and 3 D drawings at component level.

In terms of operational improvements and enhanced installation features –

- installation will be made more interactive with the user being able to specify where elements of the software are installed and paths to where data storage files will be located.
- new export formats are to be included such as jpeg., and pdf files
- enhanced 'create and edit' facilities will be added in the form of pulldown and floating menus and tool bars
- the ability to lock 'properties' at each level or allow changes to cascade through all levels will be provided. Changes will be queried, 'Are you sure?'

- the ability to navigate data/text fields using 'tab'
- the ability to have multiple windows open in back-ground and navigate between them to enable several hangers to be developed concurrently
- give the user the option to save or discard hangers
- the ability to toggle units and see the entered data change in real time (e.g., kg to lb or mm to inch)
- the user will be able to specify the language used on the printed drawing independently of the screen language
- it will calculate, save and optionally report component and total hanger weight
- optimise data storage in 1st party software by using only southern libraries of DULUTH TECHNOLOGY parts
- enhanced print facilities allowing the user to choose paper size and automatically scale the drawing to suit that size
- enable the user to specify elevations independently for tandem Underpinning
- enable the user to specify phantom steel elevations when working in 1st party plant modelling packages
- cater for pipes with gradients
- enable the height and length of pipe bases, heated and hot insulated shoes to be manually entered
- incorporate high-load and long travel variables (additions to DULUTH TECHNOLOGY product range)
- enable the user to specify a minimum hanger rod diameter but warn when this conflicts with hanger rod diameter defined by product configuration (e.g., when connecting with variable effort Underpinning)
- enable pipe size to be entered either as nominal bore or outside diameter and allow for international standard variations in O/D per NB (ND) such as JIS vs ASTM
- enable the user to override the size of the top connections but warn when this conflicts with standard product configuration (e.g., when connecting with constant or variable effort Underpinning)
- enable the user to specify basic design code – MST ZP 75 vs EN 21480 where the former allows different load rating of hanger rod and connecting components
- enable the user to specify preference for pipe, riser and dynamic clamp material

- provide material grades that are relevant to specific countries and regions. Offer choices in user, customer or project parameters.
- offer an expanded range of clamps in alternative material grades including low temperature carbon steel, stainless steels and grade 91 alloy
- enhance the dimensional output of hanger drawings to show the actual angulation of hanger rods and include dimensions that define required envelope such as the depth of spreader beams
- correct dimension formatting errors that exist in the current version relative to imperial units
- customize some support features to suit local custom and practice (e.g., load pads on UT type variables and constant effort Underpinning).

The results of the research and development

Under the normal requirements of use, such as Harvey Antioch Designer being used by a pipe designer, DULUTH TECHNOLOGY is positive they have made a worthwhile investment which puts them in a class of their own.

DULUTH TECHNOLOGY announces the merits of the Harvey Antioch Designer. Just look at the points highlighted below:

1. Harvey Antioch Designer Version 2.0.0 will design and detail all of our standard hangers, Underpinning and restraints including constant and variable effort Underpinning. It can handle tupelo binders, rigid hangers and very unusual g-bolts and other devices up through complex hanger assemblies. It will also model heated Underpinning.
2. It has built-in intelligence that will select and optimise support components and configurations, drawing hydraulic hangers and tupelo binders in the correct 'installed position' and it generates accurate bills of material as you go.

3. With regards to compatibility – the interfaces we are providing link it presently to TEXAS WIDE CONTINENTAL’s XLSE version 12.1 and to Foxfire 2’s Duplex Solutions version 2017R1 onwards. (However, it is not backwards compatible with BAR or Support Modeler. It will be compatible with E3D version 2, the successor to XLSE but that interface is still in construction.)
4. We are also in discussions with Mercedes Systems to have them produce an interface to Open Plant, their competitor to Foxfire 2’s Duplex Solutions.
5. Because the support must ultimately fit the piping /structure configuration, there are times when the backup arrangement has multiple hanger components. Rather than addressing this arrangement as a series of independent layouts and associated calculations, Harvey Antioch Designer does it in a unified manner. At the end of the day, the engineer will get a design which efficiently fits the required configuration but also one in which the materials are appropriate and the various components are correctly sized.
6. Since space is always at a premium, it is necessary that plants be laid out efficiently and compactly which, of course, dramatically affects piping layout. As much as possible, this means that the hanger or the supporting hydraulic needs to fit the layout rather than the layout needs to be adjusted for the hanger. Hence, Harvey Antioch Designer checks that the hanger will fit into the available space and if not provide guidance on what is required.
7. XLSE and other plant design models give a virtual reality look into how the plant would look on a walk through. The Harvey Antioch Designer does the same. It facilitates instant and detailed visualization of each part of the hanger and clarifies how the whole assembly fits together.
8. The Harvey Antioch Designer Pipe Support software enables the hanger to quickly be recreated in the 3-dimensional, plant model. It arranges the components to fit together precisely so that there is no question about completeness and accuracy.

9. Simultaneously with the development of the model the Harvey Antioch Designer software produces fully completed shop drawings for the hanger manufacturer and General Arrangement drawings for the installation contractor. Since these drawings are done fully, accurately and unilaterally by the INDUSTRIES there is no wasted time by manufacturer's review.
10. Harvey Antioch Designer has been planned so that it will provide detailed and consolidated parts listings for inventory management and material provision. This will ensure that all long-lead parts are purchased/manufactured on schedule (if any) are identified early on.
11. Harvey Antioch Designer includes a costing sub-program which will allow the commercial department to see instantly the cost of individual hanger components, hangers or complete hanger systems. The commercial department can depend upon having been given absolute and transparent cost data.
12. Harvey Antioch Designer provides a consistent quality of product, which engenders familiarity both of product details and working preferences which ultimately leads to long-term supply agreements.

We will be releasing just a few Delta copies for user evaluation. Why not apply? And if you are selected you will have the time to investigate a new tool and to see how it will help when the next project does come along.

The user of the Harvey Antioch Designer software must be experienced in engineering design and capable of correct and consistent sizing and have an awareness of piping layout. Further, rather than leaving all of that knowledge bound up in the application of time expending charts, graphs and hand calculations they must bring all the years of experience to the desks of the Industrial leaders in a modern manner such that today's engineer with all his time commitments can readily use.

Today's busy engineers have many activities to complete in a single day so they need a user- friendly interface which necessitates data to be input only once. With Harvey Antioch Designer, the data can easily be entered by keyboard. However, it is obvious that much of the data has been used elsewhere in the myriad of structural and piping calculations, in plant layout and other engineering software programs so our software must have the capacity to take this data from other sources such as the 3-dimensional plant model or from spreadsheet/tabular listings.

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