What to look for in Main Replacement and Risk-Assessment Software

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Abstract

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In facing the myriad decisions on main assessment and replacement, LDC personnel are increasingly using computer technology to enable their determinations. This paper will review the types of attributes and capabilities that are needed in that software to make the function efficient.

Introduction

In the last 15 years various software has been developed that will assist in the significant challenges of managing piping assets. They include functions such as prioritization of possible main replacement segments and risk assessment analysis. The attributes that these software should possess, and their ability to interact with company systems are key in successful implementation. In this paper I will discuss the aspects of those types of software that will assist in creating a successful management tool.

Aspects of Successful Systems

By its nature, the distribution of natural gas involves some measure of risk. In analyzing the piping system we should capture the data (knowledge) about the characteristics of the system and its history that will best assess the risk of the many segments that may need replacement (or in some cases, those segments that need more operations attention). The three key aspects that will influence the potential success of main replacement/risk assessment software are:

1. Vendor
- Vendor Experience
- Development stage of the software
- Training service
- Technical Support levels
- Upgrade
- Customer satisfaction responses
- Establishment of user groups

2. Functionality/Implementation
- What platform(s) does the software support?
- Is the application single user or multi user?
- Other technological issues
- Implementation schedules
- Closed/open architecture
- Ability to import current data
- Ability to interact with other systems
- Ability to interact with current GIS
- Ability to perform specific routines requested
- Quality Assurance/Quality Control
- Ability to customize for each end user
- Modifying for future functions
- Decision making that is enabled
- Outputs produced
- Level of user experience
- Documentation

3. Costs
- Hardware/software/licensing
- Implementation
- Support
- Upgrade

1. Vendor

There must be a hard reality check undertaken when planning the performance required of software that is to be acquired. In advance of contacting potential vendors it is important to decide what functionality will be required, the expected outputs and the systems environment that the software is expected to operate within

- Vendor Experience

When selecting a system it is important that there is confidence in the ability of the vendor to have sufficient experience with utility issues, that they are cognizant of what the current “hot buttons" are, and that they have a product that can serve the market. Having had a product in the market and proven is obviously a plus, if the vendor has kept the product upgraded and up to date as far as topical issues are concerned.

- Development Stage of the Software

We need to be aware of the stage of the software being considered. Is it a beta version? Have all the bugs been worked out? Is it older software that has not been upgraded or kept current?

- Training Services

The vendor training process is a key aspect that is important to consider. Are there only a limited number of key people trained? Are employees who may be brought in later given similar training? Is the training individual at your location or in a group setting at a vendor location?

- Technical Support Levels

Initially there will be a great deal of Q&A initially that the vendor will need to respond to; however, it is important that technical support is available in the future, and on an ongoing basis. The vendor should have a full staff for support, not a single key person, and that support should be available for more than a typical 9 to 5 schedule (especially considering the implications of time differences between East Coast-West Coast)

- Upgrades

Eventually the software chosen will need to be upgraded or the vendor will introduce a new version. It will be important that vendors retain backward compatibility in new versions. In addition, there needs to be a proactive stance from the vendor in terms of communicating the upgrade availability, as the products are refined.

- Customer Satisfaction Responses

It is always desirable to confirm what the experience of current customers has been with the chosen vendor. When requesting a list make sure the calls are not "steered" to any one individual or company.

- Establishment of User Groups

Software providers who have been in the market for some time may already have user groups established. This is a very beneficial situation, since there can be a "self-help" environment established to discuss common problems. From the vendor perspective, hosting such groups can assist their technical support, or alleviate the call volume for support if users have a network in parallel to the vendor.

2. Functionality/Implementation

The vendor has provided a fully integrated software solution to meet the customer's requirements

- What platform(s) does the software support?
- What Operating system does it run on?

Compatibility is a key issue for any software that is used. The ability to run under a similar operating system (e.g. Windows NT), or support company preferred platforms (e.g. Oracle), will need to be confirmed.

- Is the application a single user or multi user?

A company may require a single user, or a multi-user (with appropriate security) application. This need should be established with the vendor.

- Other Technological Issues

It is possible that a company may require either a web-based or a wireless component of the software that should be included in the discussions. This could be either data acquisition or output sharing.

- Implementation Schedules

The ability of the vendor to fully implement the software as soon as possible will be key to assisting the customer. This point may be a significant difference between competing systems/vendors.

The schedules should have enough time for the customer's specific requested abilities to be incorporated and tested. Compatibility will need to be verified and data integration/links to entrenched systems verified.

- Closed/Open Architecture

An Open Software Architecture is one designed to officially approved national standards, or one whose specifications are made public. The great advantage of open architectures is that anyone can design add-on products for it. The opposite is closed or proprietary software.

The behavior of interacting open architecture systems can be better predicted.

- Ability to import current data

As can be deduced from the discussion of operating platforms and open architecture, the ability to import current data seamlessly is a top performance issue. Systems occasionally use "middleware" or translators to import data; it is more efficient if this occurs from the software itself. There may also be a limit on the number of data sets that can be incorporated, and this should be explicitly discussed.

- Ability to interact with other systems

There may be other systems that feed data that the software must be able to interact with, such as electronic One-Call locate requests. These must be covered.

- Ability to interact with current GIS

Most of the data expected to be used will be found in a GIS, and so this relationship is significant. Map and geospatial references are key to maintaining on-going map reference reporting. It is advantageous to display results or data graphically, so a graphical user interface is necessary.

Many sources for disparate data will need to be handled, and this should be a streamlined process.

- Ability to perform specific routines requested

Each gas company will have preferences beyond the core capabilities of the software. The flexibility to perform these additional routines may be the deciding factor in software comparisons.

- Quality Assurance/Quality Control QA-QC

It is important that there is a quality control function built into the software or the process, so that a high level of data integrity is maintained. At each step along the implementation schedule QA-QC procedures should be used.

- Ability to customize for each end user

The customer's needs will vary based upon the business culture and that operator's pipeline integrity results. Many routines or algorithms within the selected software may not produce universally suitable results (especially in terms of prioritizing replacement segments) in every company's system. It will be important that the software or algorithms can be manipulated or established to produce results expected by each company's functional experts.

- Modifying for future functions

The software must be able to adapt to future needs.

- Decision-making that is enabled

It is expected that the software will identify likely failure risks, but in addition, there may need to be ad-hoc decisions undertaken. It is important that this can be achieved. It is also important that decisions and data are "traceable" so that the path leading to a decision can be illustrated to others.

Some software may identify the appropriate maintenance activities that should be increased or modified. In others, the software may allow individual threat and consequence analysis at specific locations or segments. Also, some systems may have an "Executive Overview" function that may be of benefit.

- Outputs produced

The output of a risk assessment should include the nature and location of the most significant risks to the pipeline. The types of output: lists, data or decisions with alternatives, need to match the user's specifications. It could be that the user requires management reports to prioritize risks, or it may be that inspection, repair or scheduling reports are desired. The particular requirement needs to be met.

- Level of User Experience

The software to be used should match the capabilities of the target user personnel. In some cases, it may be necessary to improve skill levels, but the level of competence required should be within reason.

- Documentation

User manuals and technical documentation are essential reference materials that each system must have. They should be well designed, understandable and updated regularly.

Costs

Obviously costs in general are an issue. Some specific items to be aware of are:

- Hardware/Software/ Licensing

Some of the questions that need to be answered in this area are:
Are there specific issues regarding what hardware might be used?
Is there an internal company capital expenditure required to meet this?
What method is used for the software acquisition, is it one time payment?
Are there annual license fees?

- Implementation

Implementation methods and schedule will affect costs.
What level of effort is required to implement or migrate data?
Can internal personnel handle any of it, or will it be an external effort?

- Support costs

Are there annual maintenance costs, or costs for technical support?

- Upgrade costs

What arrangements are made for upgrades - who pays for what?

Current Issues

Currently, two topics dominate the needs of gas companies:

- Main Replacement
- Risk Assessment

Main Replacement

As an integral part of any mains integrity management program, an effective risk assessment process should prioritize risk to facilitate decision-making.

Properly implemented, risk assessment methods can be very powerful analytic methods using a variety of inputs that provide an improved understanding of the nature and locations of high-risk segments of mains.

Main replacement software should thus be able to prioritize materials and their differing risk factors into one priority list. As previously mentioned, there should be enough flexibility to "tailor" the risk factors for each company. Interaction with GIS data is important, especially if there are graphical user interfaces involved.

Rick Assessment

In distribution use, risk assessment is part of the prioritization of main segments and replacement. In the transmission field, the new regulations on pipeline integrity make risk assessment a more integrated part of the total software suite.

Transmission software ideally would be able to interact with GIS mapping and its data to provide HCA assessment, and any associated potential impact zones. The software should be able to use company data to identify the potential threats as defined in Federal Regulations and as detailed in ASME B31.8S, (at the time of writing the rule is not yet finalized). It should also be able to define and gather the necessary data to characterize the segments, assess the location specific threats and prioritize them based upon the consequences.

The types of data to support a risk assessment are unique to each system and will vary depending on the threat being assessed.

Generally the software will provide the operator with far more detailed knowledge about the characteristics of their pipeline than ever before and will have the ability to manage hazard analysis. One set of data that needs to be included is the knowledge of experienced operations personnel. This is a key element in an integrity assessment.

Integrity assessment method selection is based on the threats that have been identified. More than one integrity assessment method may be required to address all the threats to a pipeline segment. It is important that the software can produce these types of alternatives. In addition, as assessments are made, the alternatives and remedies will change. This is a dynamic process that will constantly be updated and modified so that risk is also being continually reassessed.

Conclusion

When considering the purchase of Main Replacement or Risk Assessment software, it important to plan a detailed list of requirements beforehand.

Developing requirements will compel a familiarity with current and expected performance parameters.

Documenting needs and the methods used by various software to meet those needs, expedites a productive decision.

Vendors

Software vendors (note this is not an all-inclusive list)

Baseline Technologies
Suite 100, 150 Chippewa Rd.
Sherwood Park, Alberta, Canada T8A6A2
780-417-4311
www.baselinetech.com

Geofields
909 Fannin St. Suite 3650
Houston, TX 77010
(713) 462-4502
www.geofields.com

Bass-Trigon
8101 South Shaffer Parkway
Suite 201
Littleton, CO 80127
www.bass-trigon.com
(303)-881-4379

PII Group
5600 Greenwood Plaza Blvd
Englewood, CO 80111
303 570-1573
www.ps.ge.com

MJ Hardin Associates
1019 Admiral Blvd.
Kansas City MO 64106
816-651-5706
Ewiegele@mjhardin.com

Baker Hughes - Pipeline Integrity Management Services
Tel: (281)-276-5749
www.bakerhughes.com

Vantage Management Solutions
28 South State Street
Newtown, PA 18940
(215) 968-7790
www.optimain.com

URS Greiner Corp
500 12th Street
Suite 200
Oakland, CA 94607-4014
Tel: 510.893.3600
www.urscorp.com

Optima Inc
220 Powell St
Emeryville, CA 94608
(510)-594-2300
www.optimainc.com

Utility Business Services
1085 Morris Ave
Union, NJ 07083
(908) 289-5000 ext. 5601
www.ubs-inc.com
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