

Daratech 2D vs. 3D Study Highlights

May 2008

Daratech 2D vs. 3D Study

This study is about the relative merits of 2D vs. 3D plant creation and maintenance software and is based on the opinions of process and power industry engineers, managers and executives engaged in plant creation, operations and maintenance.

Plant design engineers made up 35% of the study participants while engineering managers represented 23% of the participants. The others were engineering IT managers and professionals, company executives and maintenance managers and engineers. More than half of the participants (51%) were from companies with more than 100 employees, while 29% came from companies with more than 1000 employees.

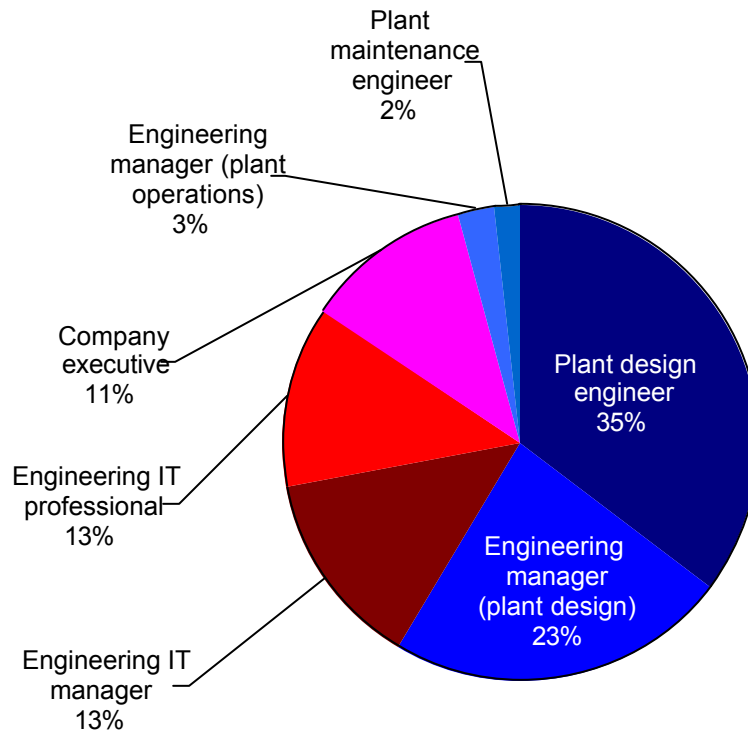
Participation was solicited by e-mail using a mailing list of 32,733 e-mail addresses provided by Access Intelligence, LLC, the sponsors of the daratechPLANT conference, as well as other lists. These lists were principally of daratechPLANT conference prospects, attendees, and process and power industry subscribers to Access Intelligence's publications targeted at the process and power industries.

The first 482 responses received were used in the study analyses. Responses were collected, on-line between February 7, 2008 and March 10, 2008 using the facilities of SurveyMonkey.com. **This Study was sponsored by Bentley Systems Incorporated.**

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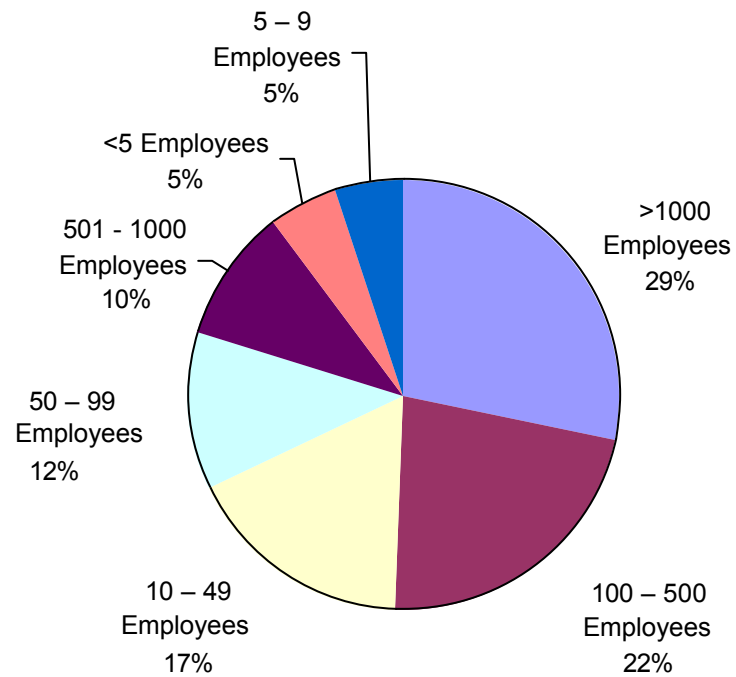
How would you describe yourself?



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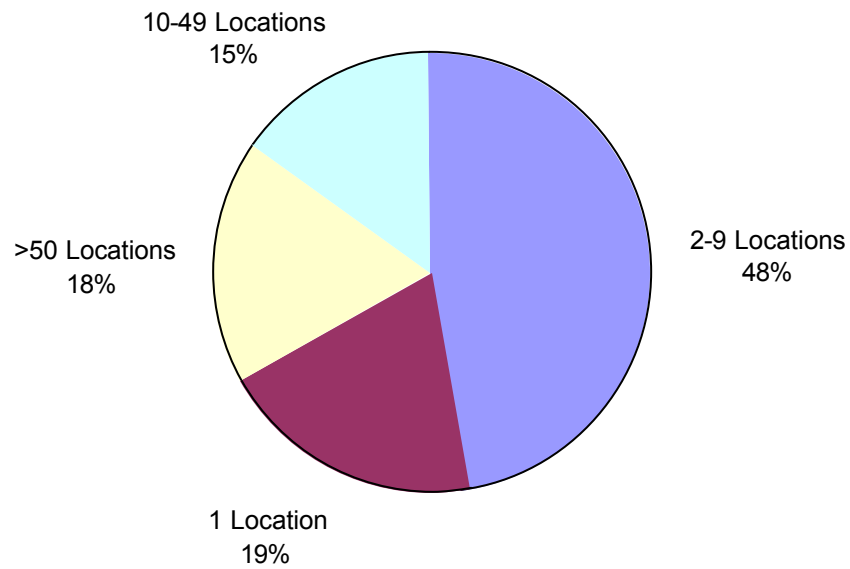
How many people are employees of your organization?



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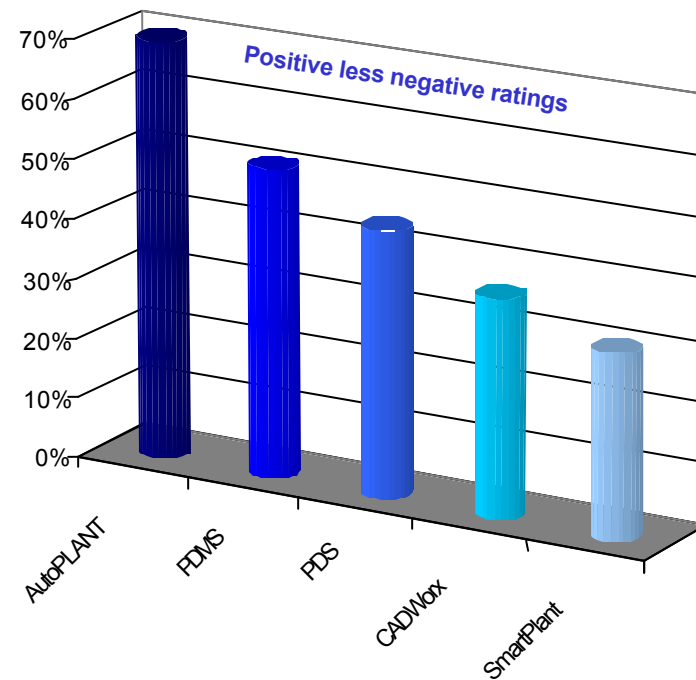
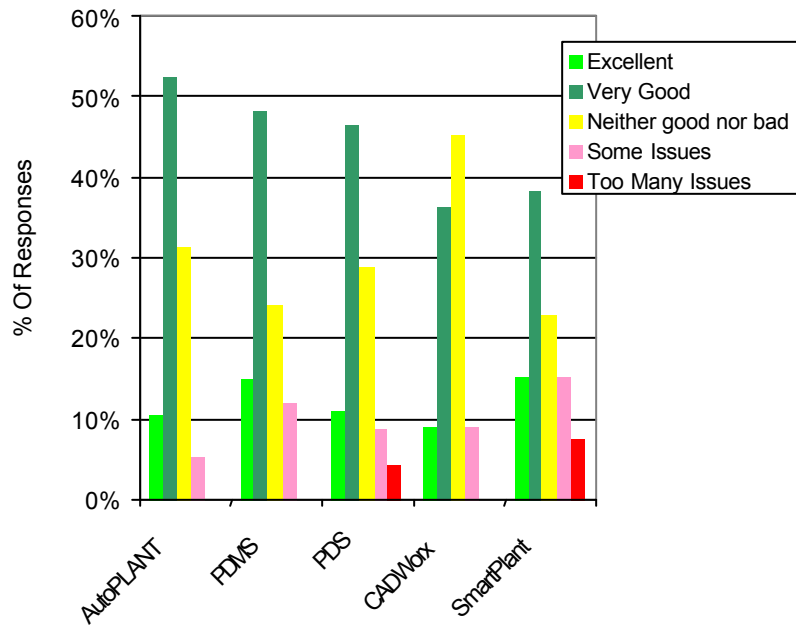
How many separate locations does your company have?



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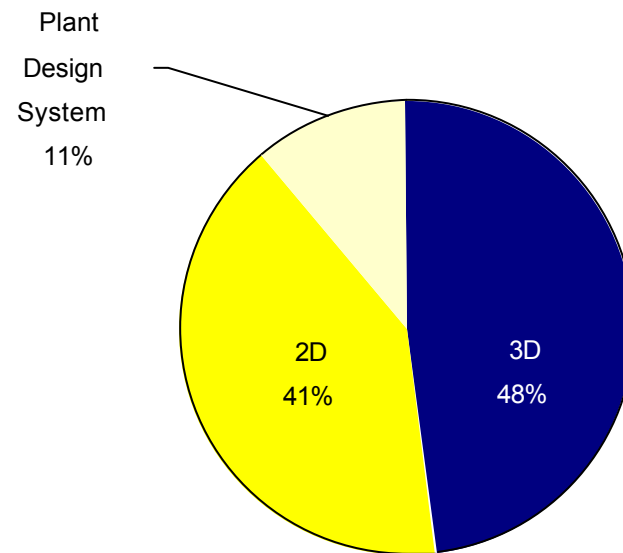
Overall, how do you rate the [3D] plant design systems you are using?



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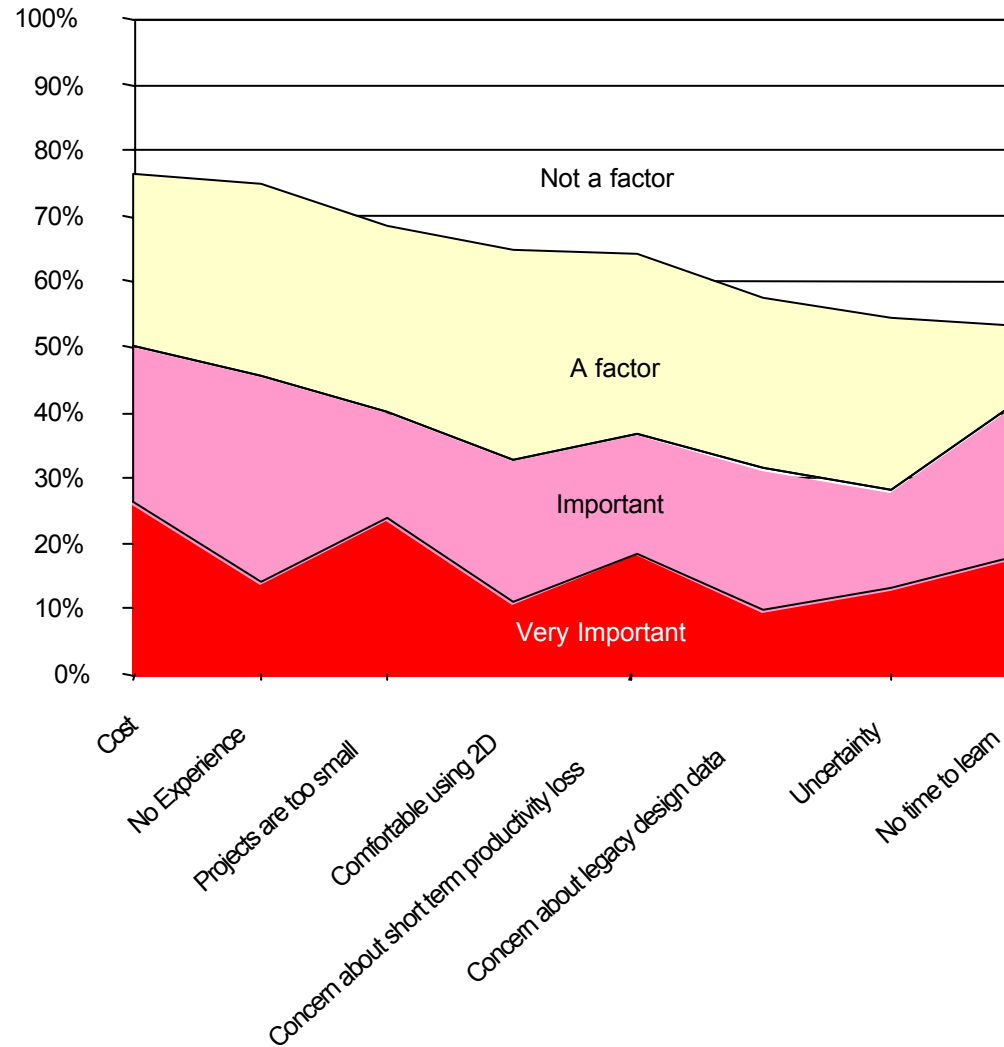
Are you mostly a 3D plant design system user,
or do you manage mostly 2D plant design system users



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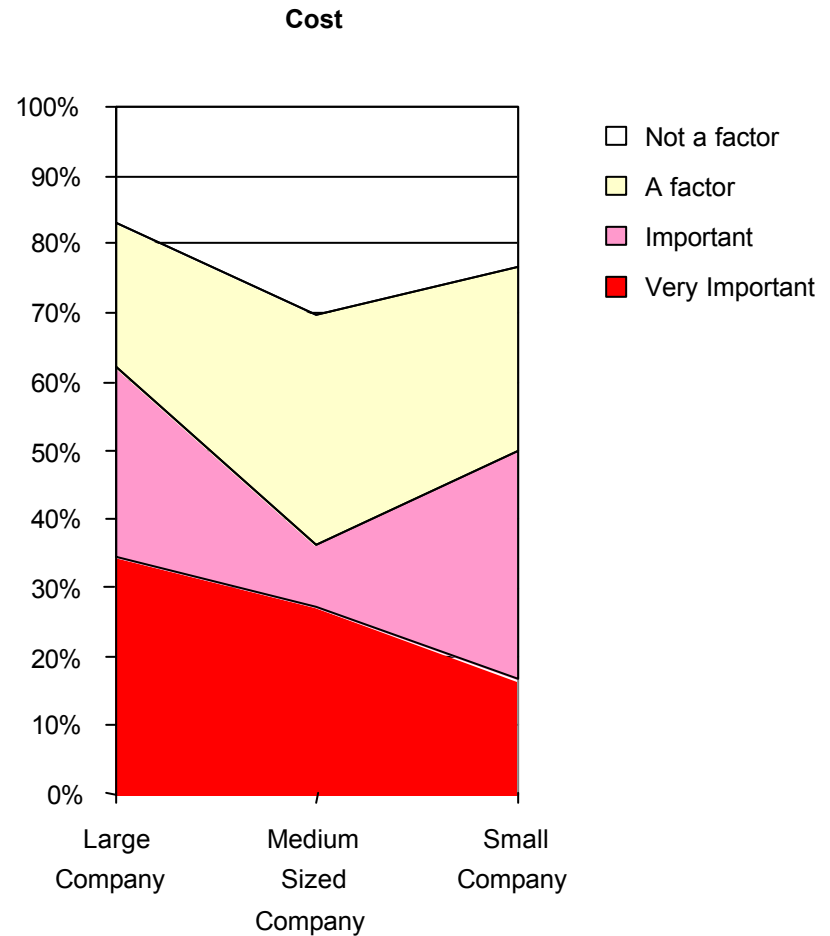
Why are you not using a 3D design system more often, or not at all?



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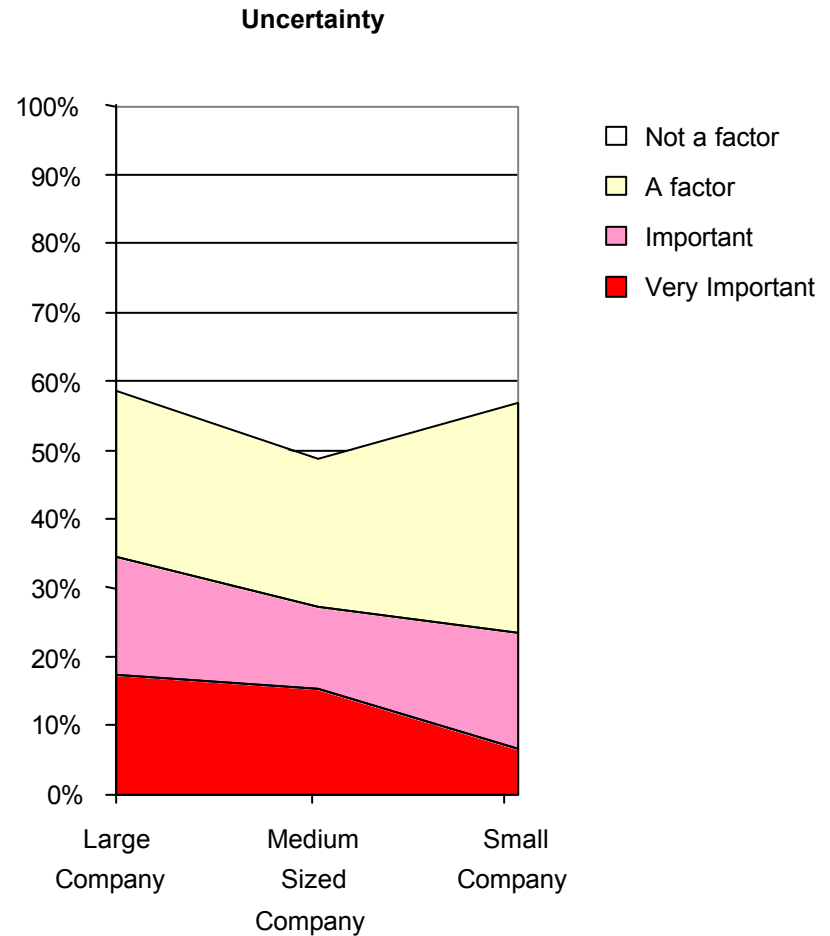
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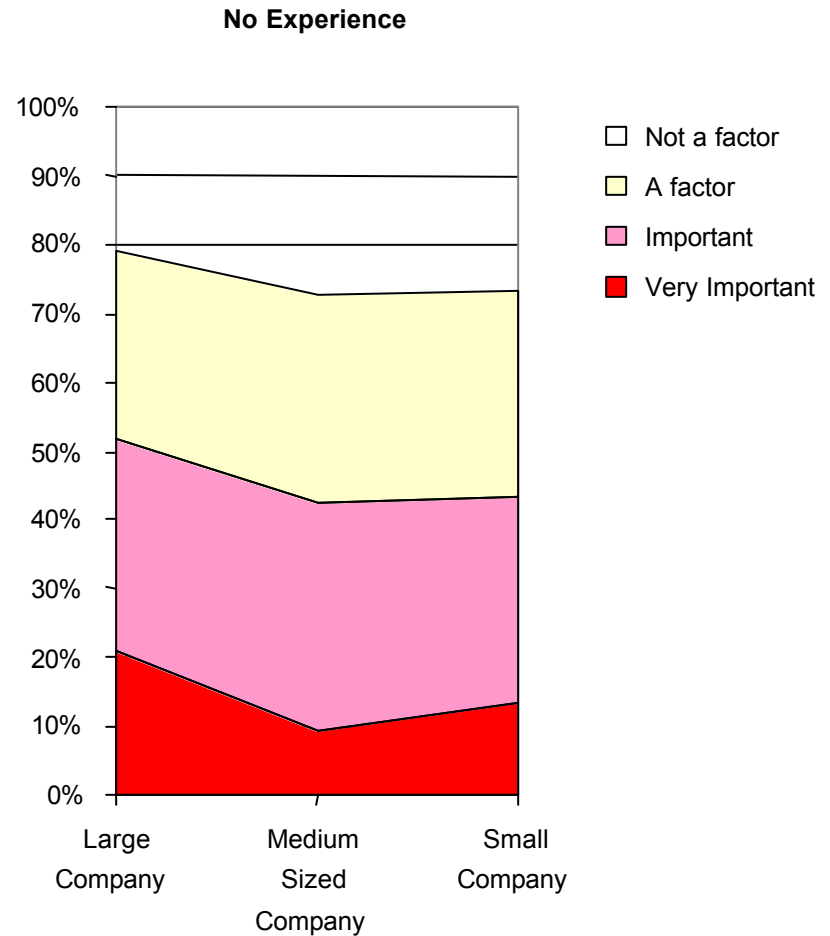
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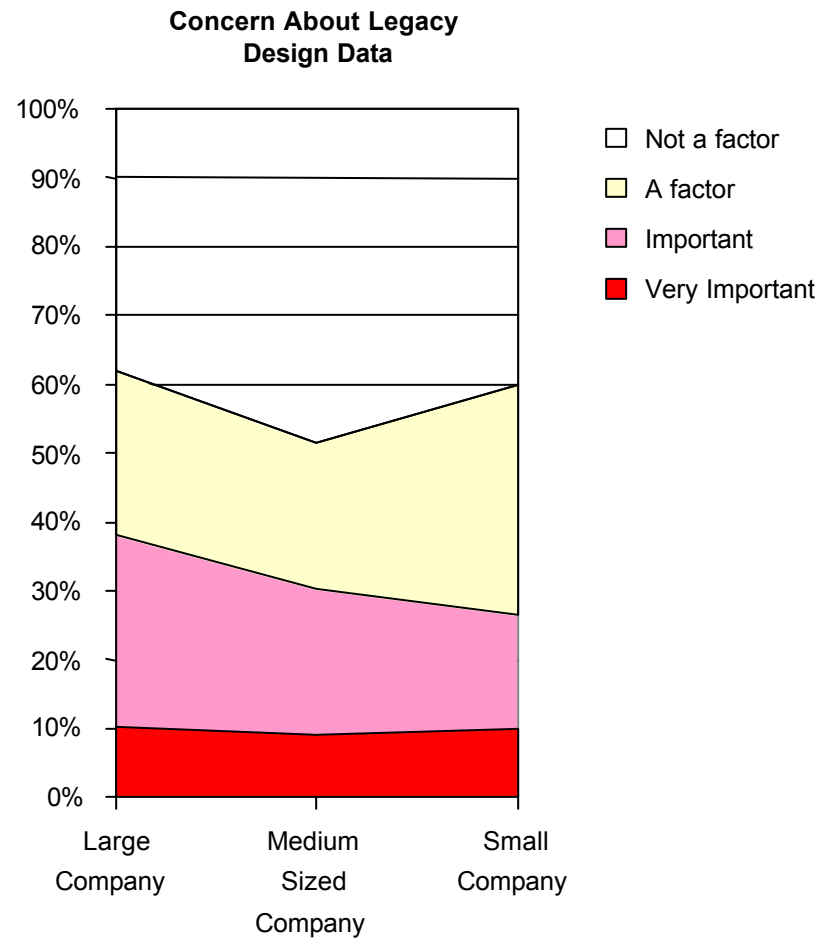
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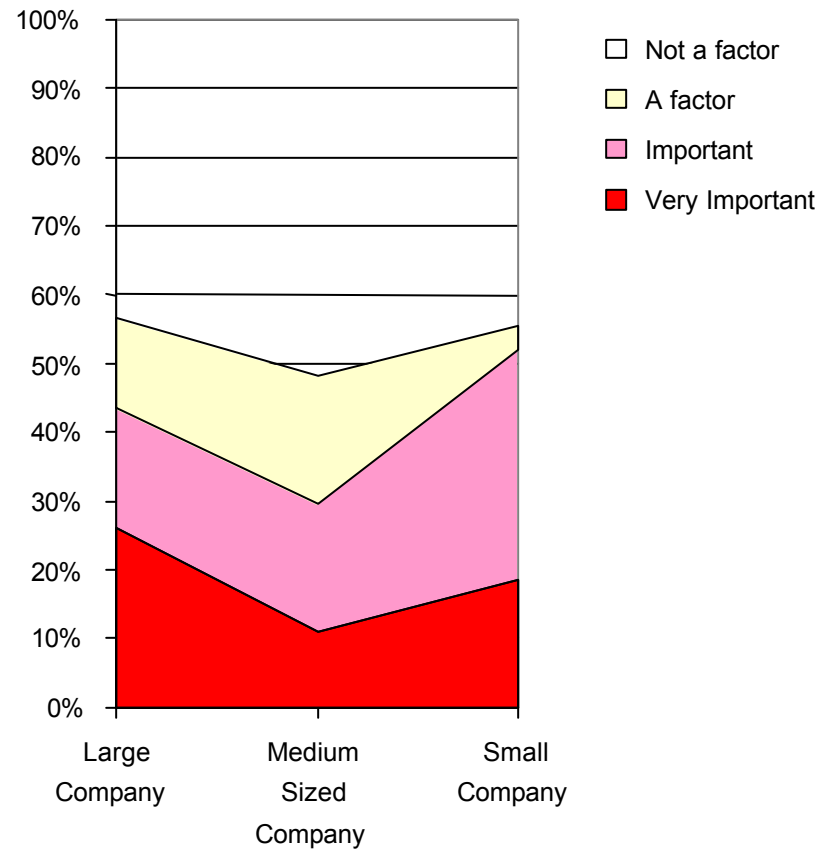


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Why are you not using a 3D design system more often, or not at all?

No Time to Learn

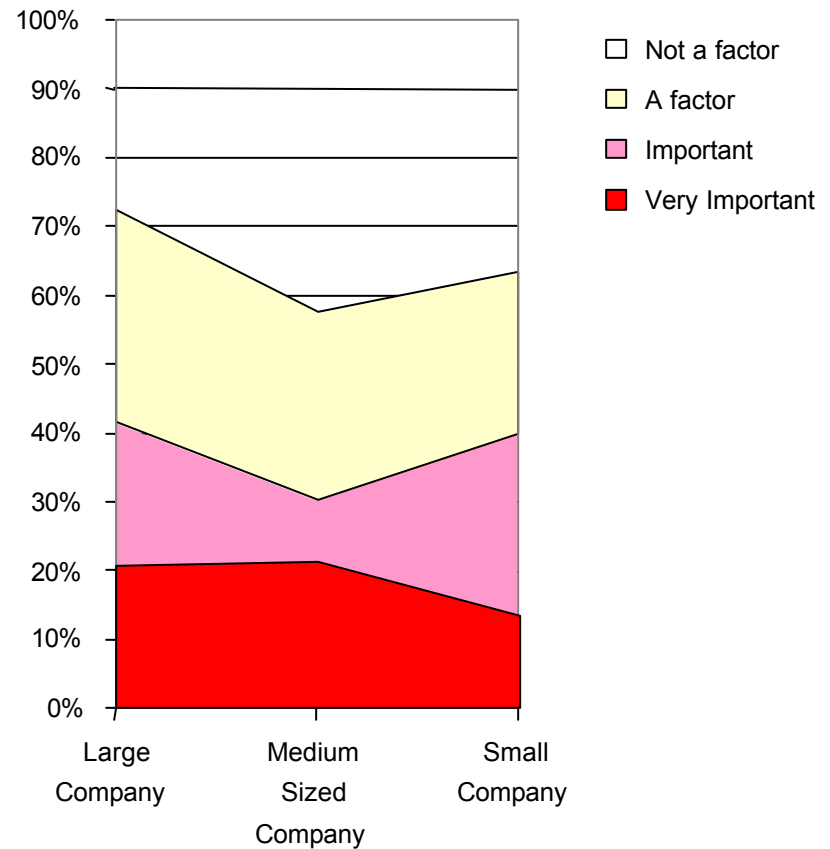


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Why are you not using a 3D design system more often, or not at all?

Concern about short term productivity loss

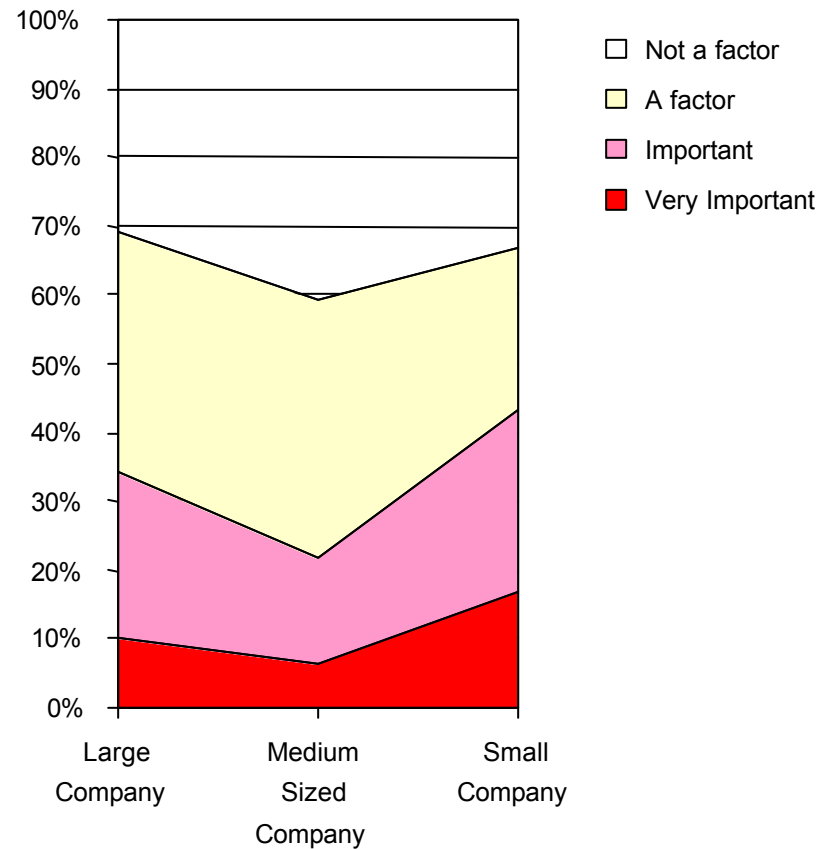


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Why are you not using a 3D design system more often, or not at all?

Comfortable using 2D

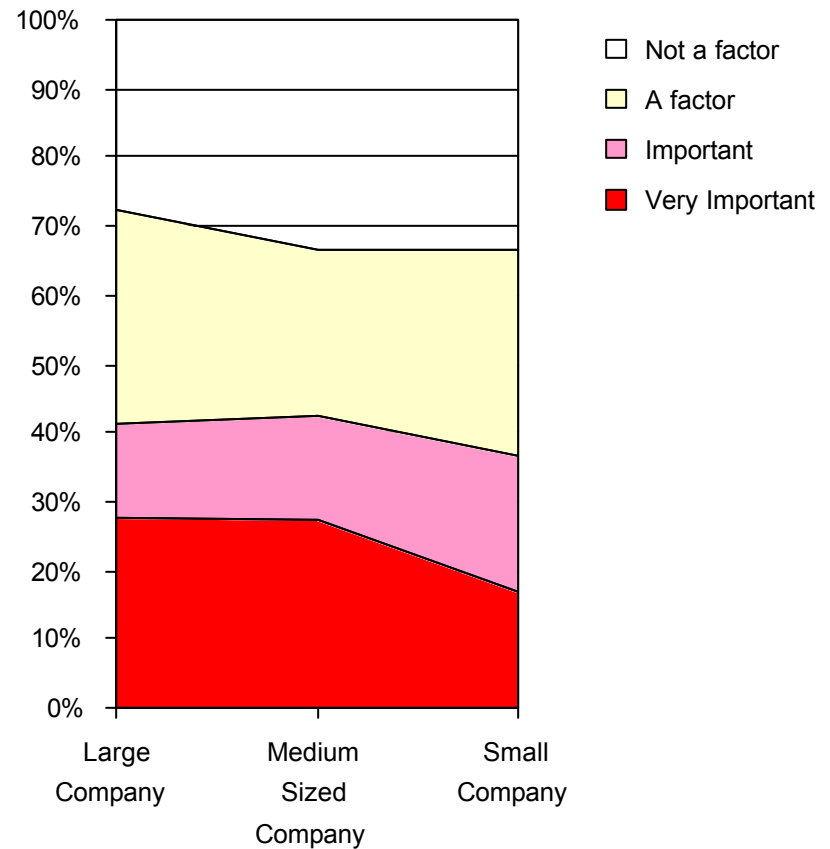


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Why are you not using a 3D design system more often, or not at all?

Projects are too small



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Why are you not using a 3D design system more often, or not at all?

- Most electrical and instrumentation drawings are non-dimensional (2D).
- The people that know 3D are new to the company, and the people that have been here designing plants forever have always done it 2D and that's what they know. They would be giving up control to do it in 3D. They'll have to be pushed by clients not the CAD monkeys that know 3D.
- Interoperability
- Current projects are all front end. Detail design will be 3-D
- Regulator acceptance and interaction with the other design companies
- Clients specify 2D for their designs. Would like to encourage clients to accept 3D.
- Lack of knowledge on what benefit we can get for using 3D software
- Client requirements for easy adjust[ment] in house
- The kind of projects [we have] are basically for 2D

COMMENTS

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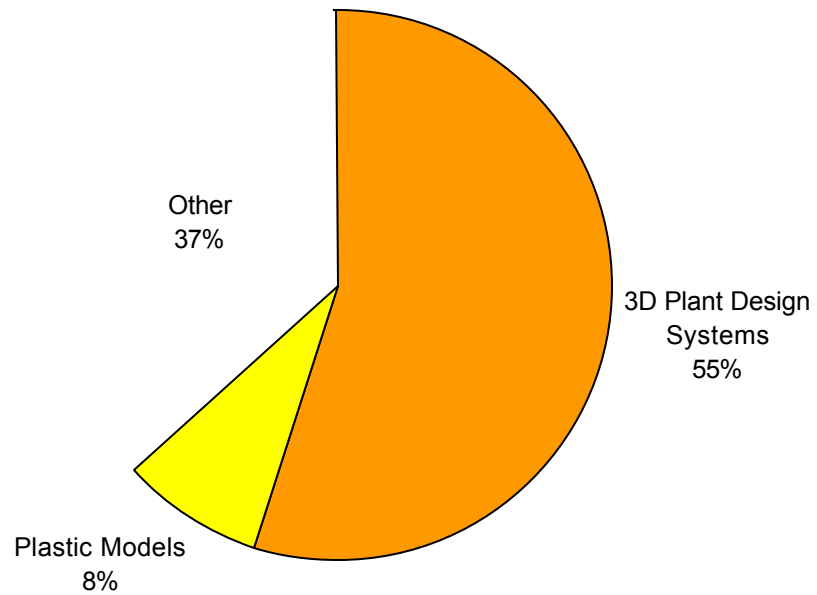
Why are you not using a 3D design system more often, or not at all?

- The younger designers are given the majority of modeling assignments and the older guys, who are not slow, are mysteriously given the extraction work.
- Availability of operators and expense of operators
- 3D design software promises more than it can deliver, is overly complex and expensive. Requires knowledge beyond what's expected of CAD production staff.
- Cost to train and lack of available qualified users
- The company I am currently working for are only now in the process of changing to a proper 3D system.
- 3D systems[are] too complex and heavy to manipulate
- I work [only] on ... electrical [drawings].
- [I'm] stuck in [a] flexcad world. [We have] too much history of 3D-to-ISOS [conversions that] do not work...

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What do you use for clash detection?



COMMENTS

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What do you use for clash detection?

- Manual review of 2D plans and elevations
- In 40 years in the business, the only problem I ever had was when the contractor ignored the drawings
- Two different view in AutoCAD
- [I] have no involvement with this process
- We don't do clash detection, or 3D. We SHOULD, but.....
- Nothing
- Intimate knowledge of the project.
- [I] study 2D drawings
- [It's] not necessary for simple construction
- Nothing automated
- Leveling, using references.
- Layered drawings

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What do you use for clash detection?

- Field check
- [We're] still researching what to purchase
- For 2D we use technical manual reviews
- Accurate initial calculations and measurements
- Manual checking
- BrisCAD
- I manually [check] drawing[s] for clash detection.
- By human calculation
- 2D models and plant experience
- We do not use clash detection
- Manually, [using] AutoCAD

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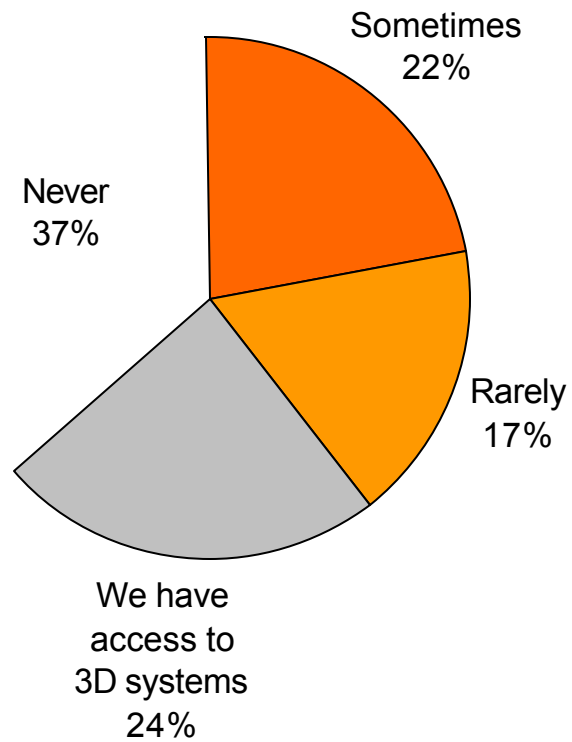
What do you use for clash detection?

- Manual [methods]
- Consultation
- Overlaying reference files
- Navisworks from a sub-contractor - 3D model using AutoCAD drawings from our sub-contractor
- Manual checking
- Cloudworx
- Run of the mill drafting methods [pen and paper]
- Prototypes for projects
- 1010

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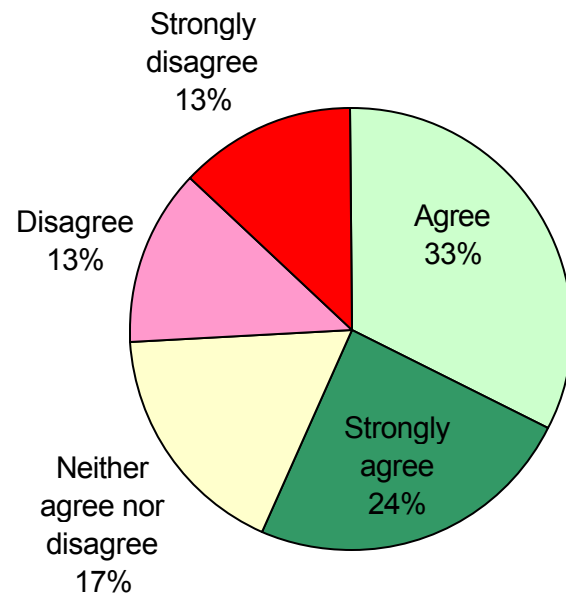
How often do you choose not to bid on projects because you're not 3D enabled?



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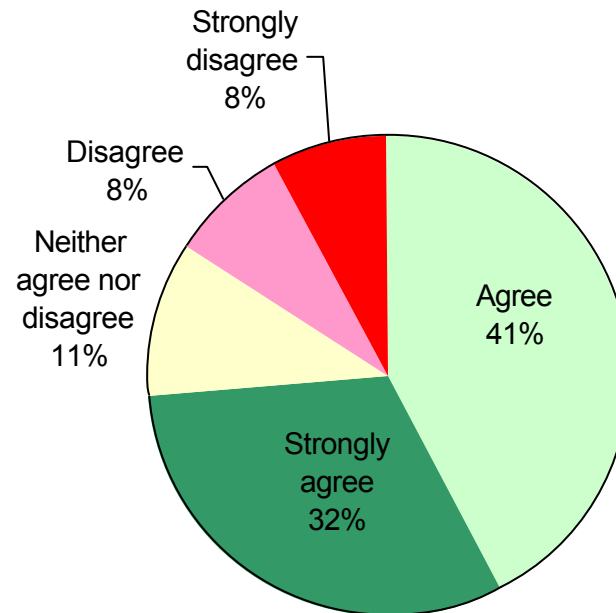
Do you agree that your company will not be competitive three years from now unless it becomes 3D enabled?



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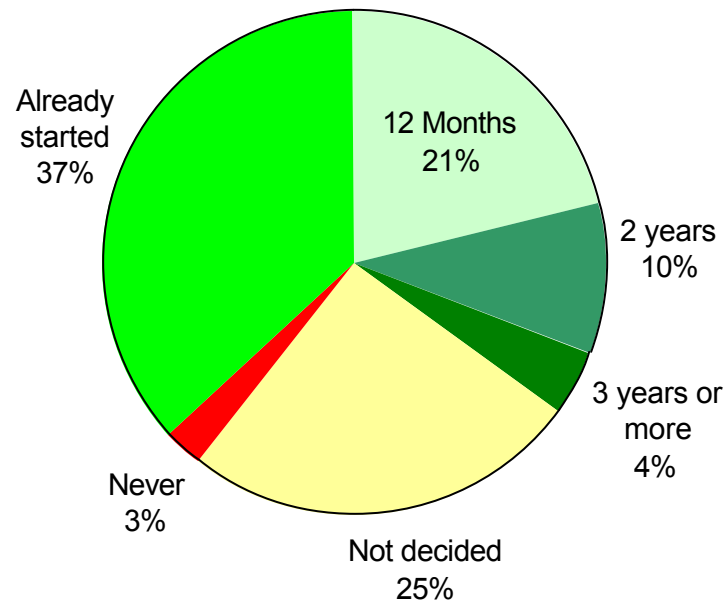
Do you agree that YOUR job options may become more limited in the future if you don't learn how to use a 3D plant design system?



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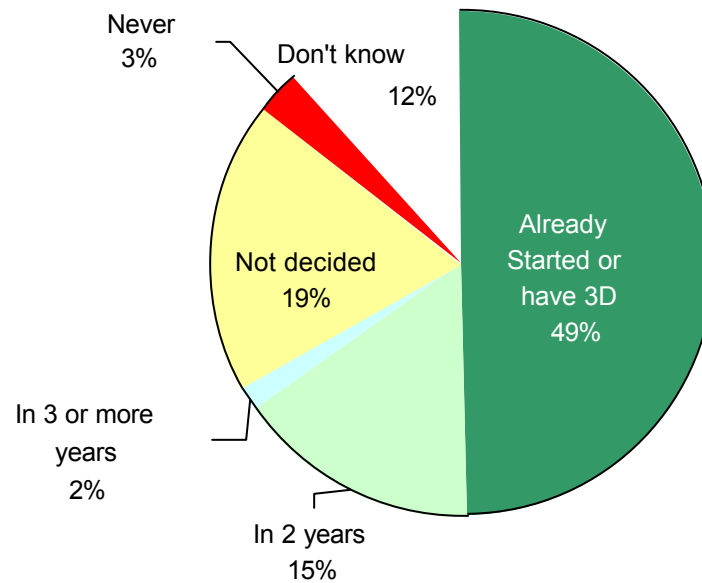
When are you planning to becoming a proficient 3D plant design system user?



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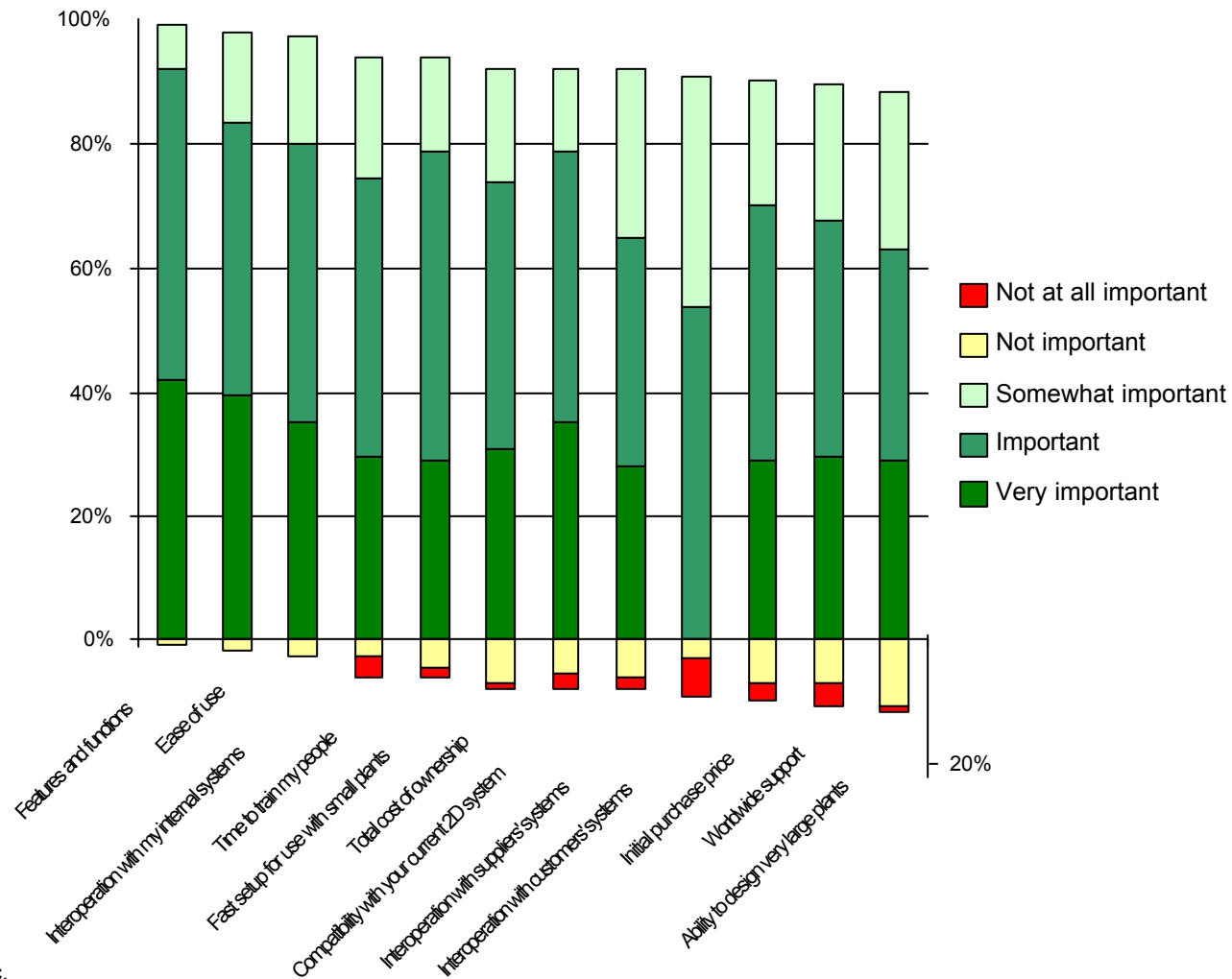
When is your company planning to become 3D enabled?



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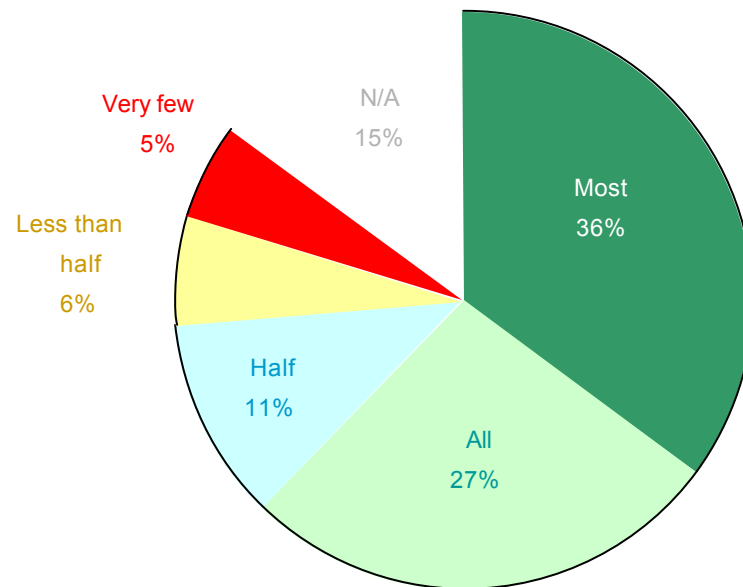
How important are the following factors when selecting a 3D plant design system?



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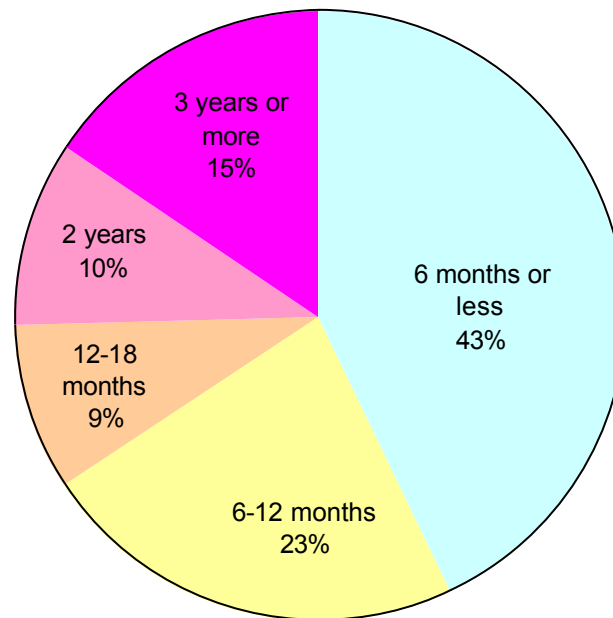
Do you believe that the people who use your 2D plant design systems will be able to transition to 3D systems?



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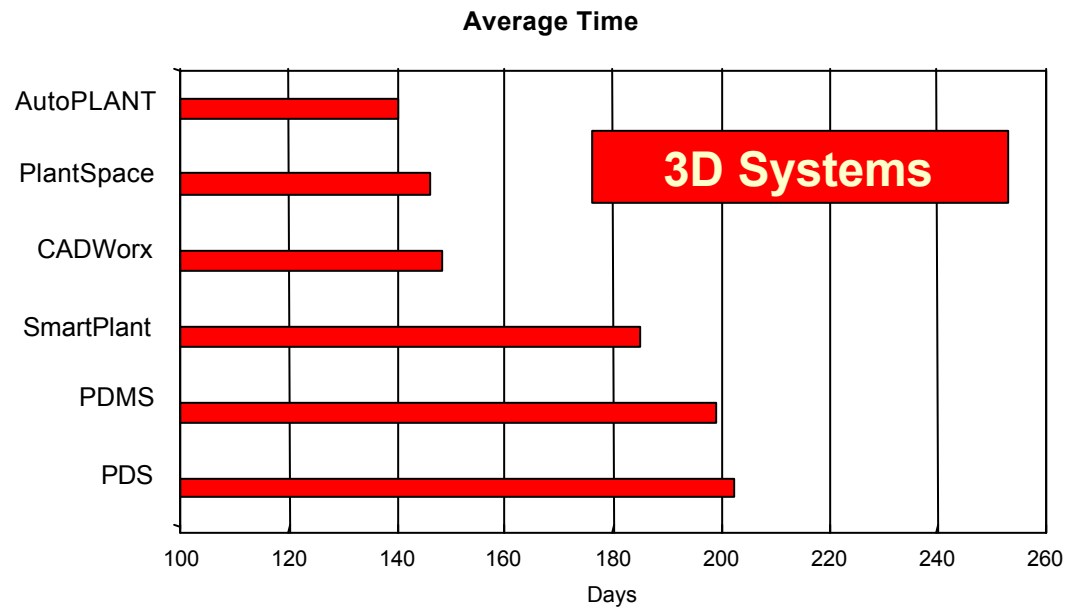
How long did you evaluate 3D plant design systems before you decided to adopt 3D plant design?



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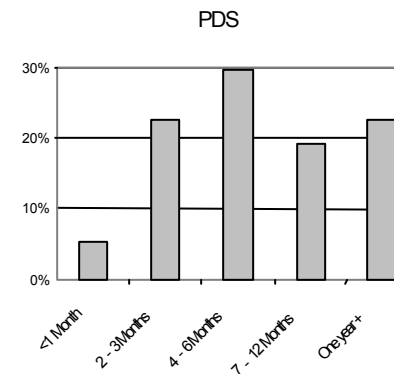
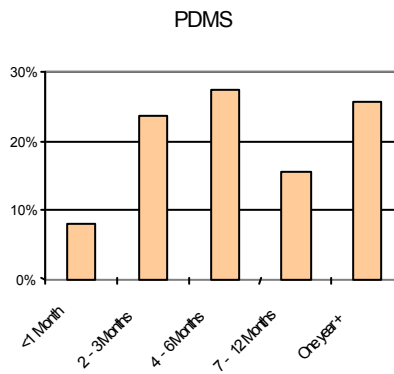
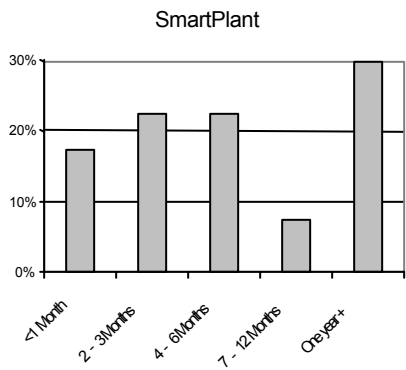
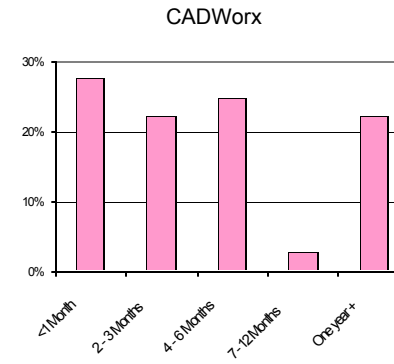
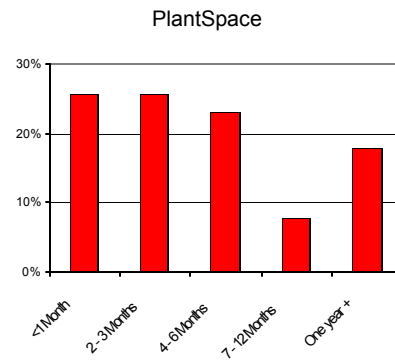
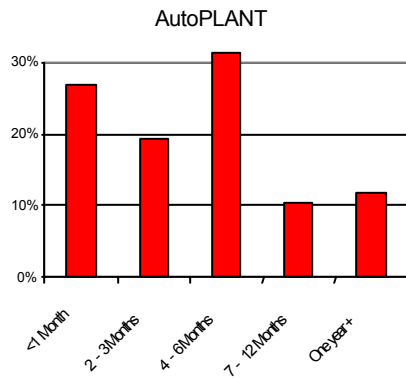
How long did it take you to become proficient using the systems below?



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COMMENTS

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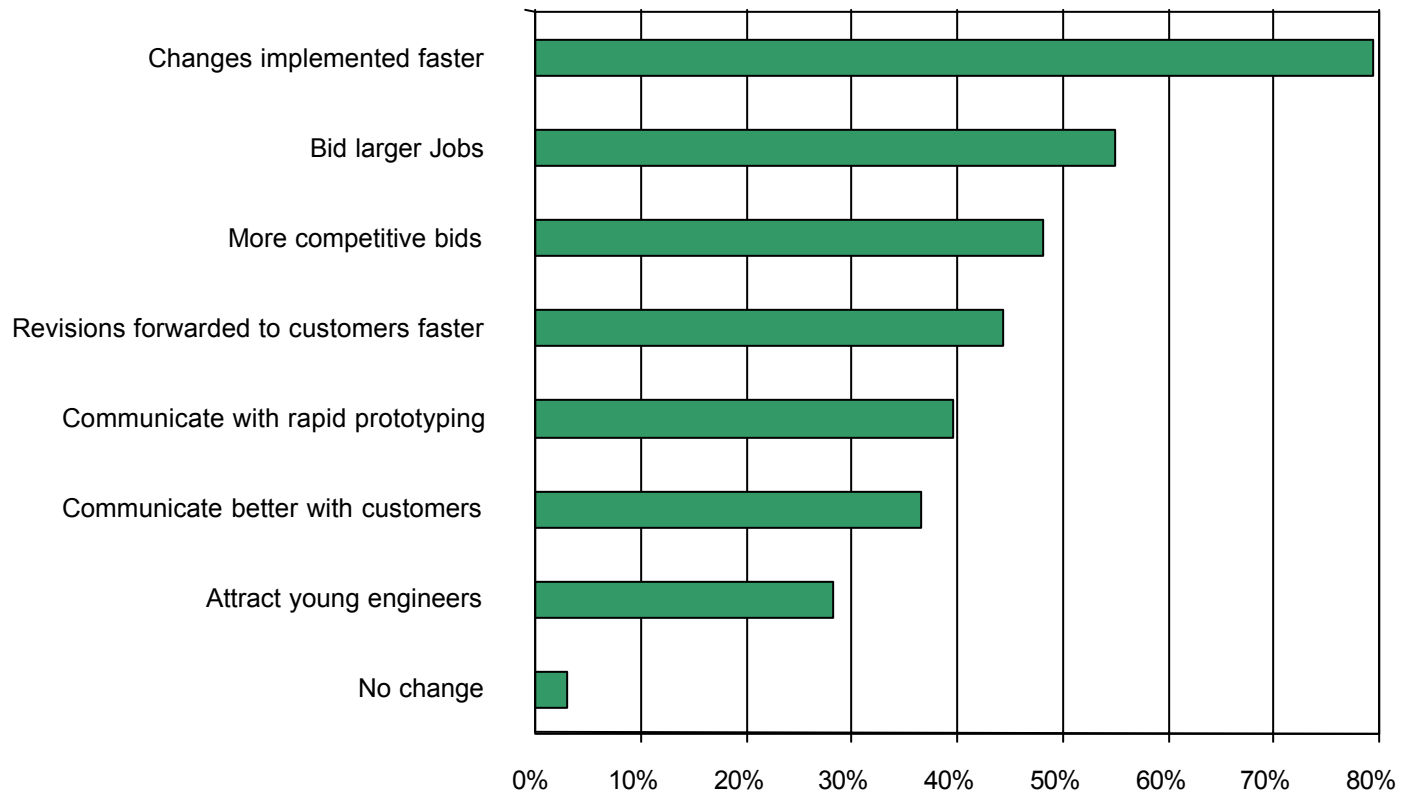
How long did it take you to become proficient using the systems below?

- Becoming a proficient user on PDS and SmartPlant takes 4-6 months but training administrators take longer. The cost of training and retaining these folks is expensive. We wish AutoPLANT and CADWorx had a bigger user base and EPCM acceptance level.
- "Proficient" is a very subjective [concept], what some would call "proficient" I might call [a] "beginner". In the case above I chose to read it as "productive" instead of "proficient" because I have an objective mechanism for measuring production.
- SmartPlant is still being updated, so learning is [an] ongoing [endeavor.]

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How has 3D plant design changed your business? (Check all that apply.)



COMMENTS

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How has 3D plant design changed your business? (Check all that apply.)

- Improved material control reduced total project cost due to reduced rework at site
- 3D is key for our as-built procedures, based on 3D-Scan
- Better clash checking between disciplines
- I believe SP3D and PDS/PDMS are completely different system. We tried to ask designers to use PDS and PDMS, however it was hard for them, but with SP3D even older designers can master the operation in a month.
- (1) 3D modeling reduces field interferences by over 85%, (2) Data rich models provide a deeper understanding of material needs much sooner in the project, (3) Data mining the models improves facility maintenance for the plant's entire life-cycle.
- The older designers have a hard time letting go of how it use to be done. Also, [they] have a harder [time] learning [a] new technology
- Field rework due to interference checking has been significantly reduced.
- On-the-job [site] mistakes and material ordering mistakes are fewer because the majority of the plant is modeled in 3D by all disciplines, and clash detection is used.
- Decreased COPQ during erection.
- [We] get isometrics faster and [and they are] more accurate

COMMENTS

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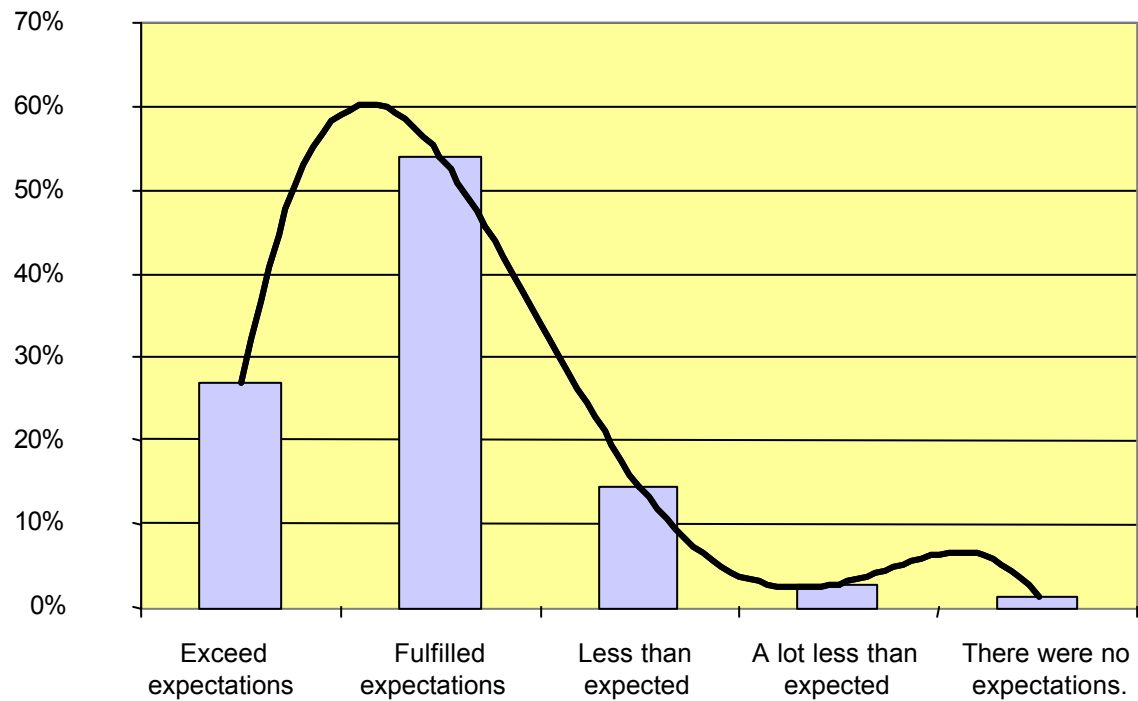
How has 3D plant design changed your business? (Check all that apply.)

- We use [3D systems] to manage our production lines
- Clash detection [leads to] less errors [which leads to] better coordination between engineering areas
- Better coordination of design [leads to] easier, cheaper fabrication and installation of pipe spools
- Reduction in data input
- Legacy data is often readily available speeding up a projects kick-off. Understanding 3D design and spatial awareness is increased 100 fold when using 3D CAD and design review tools. Communication with Clients is easier
- It's easier
- Overall Accuracy has improved using 3D plant design software
- Cost reduction due to less interferences
- We can get more work completed with less manpower
- 3D design [has] become a standard in the company

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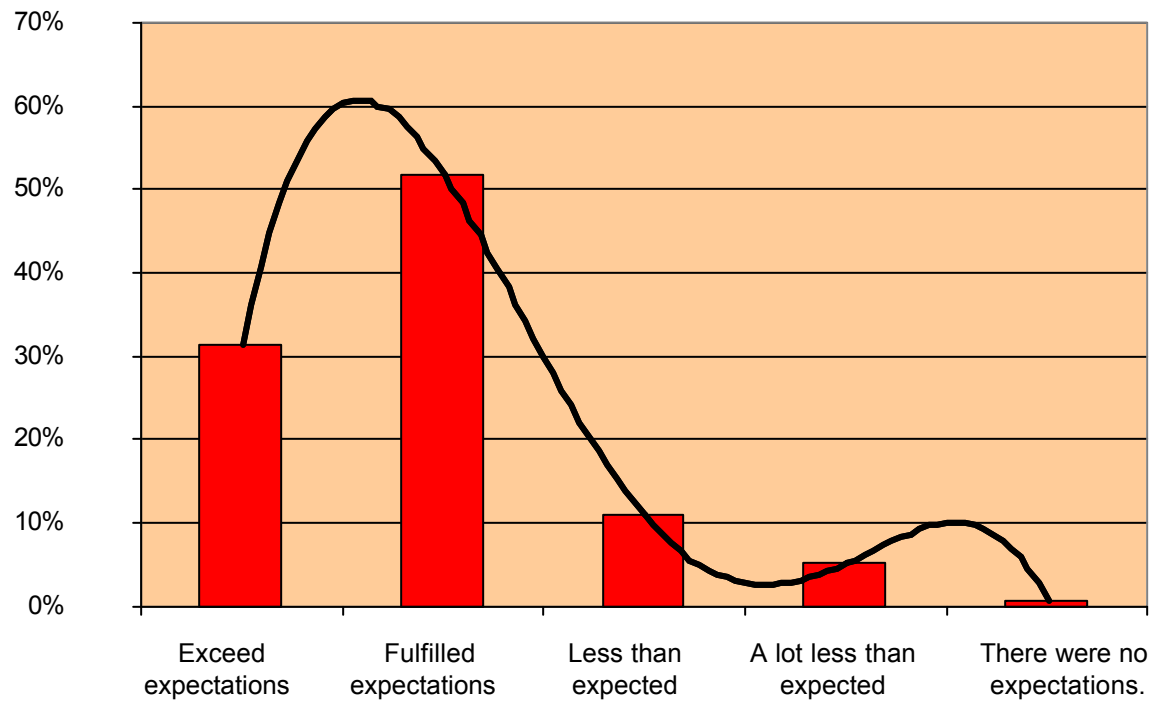
Overall, did the benefits YOUR COMPANY experienced from 3D plant design...



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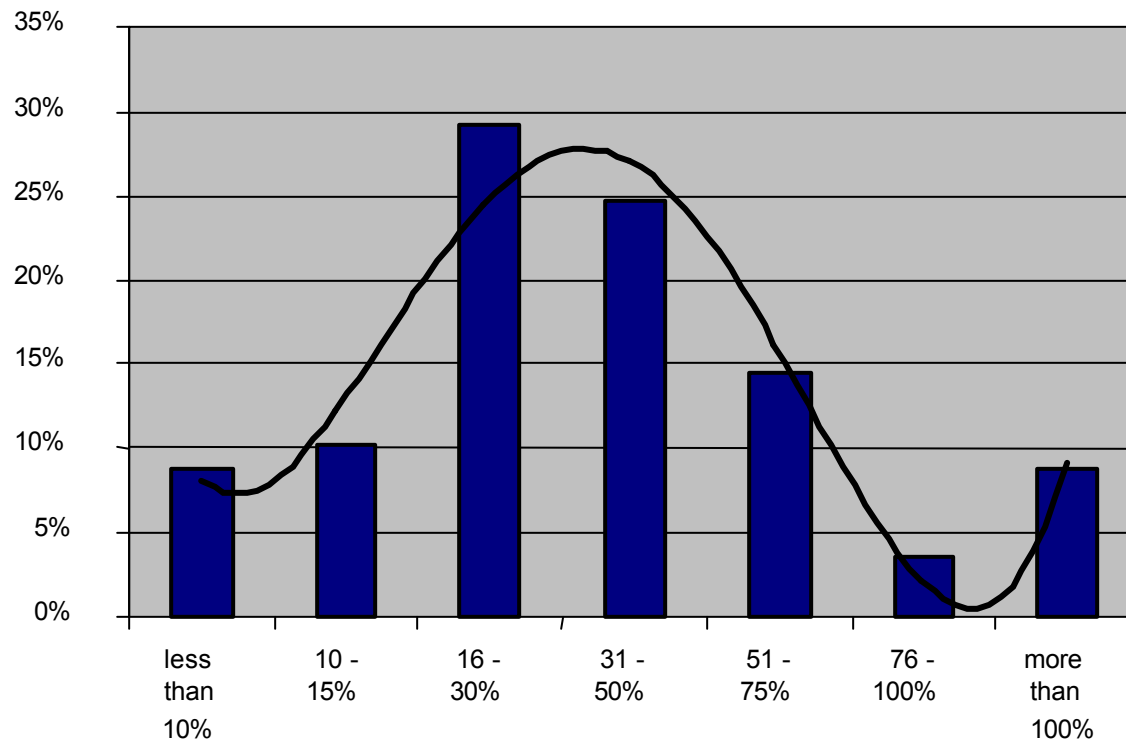
Overall, did the benefits YOU PERSONALLY experienced from 3D plant design...



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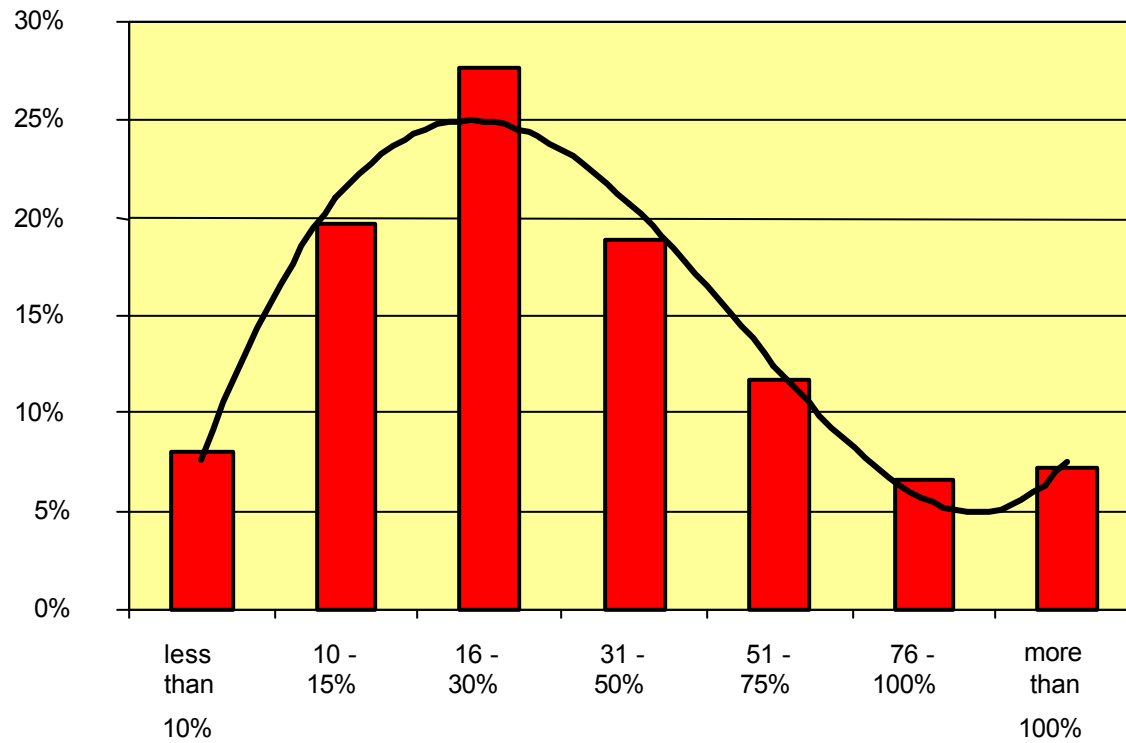
How much have your 3D plant design systems improved individual productivity?



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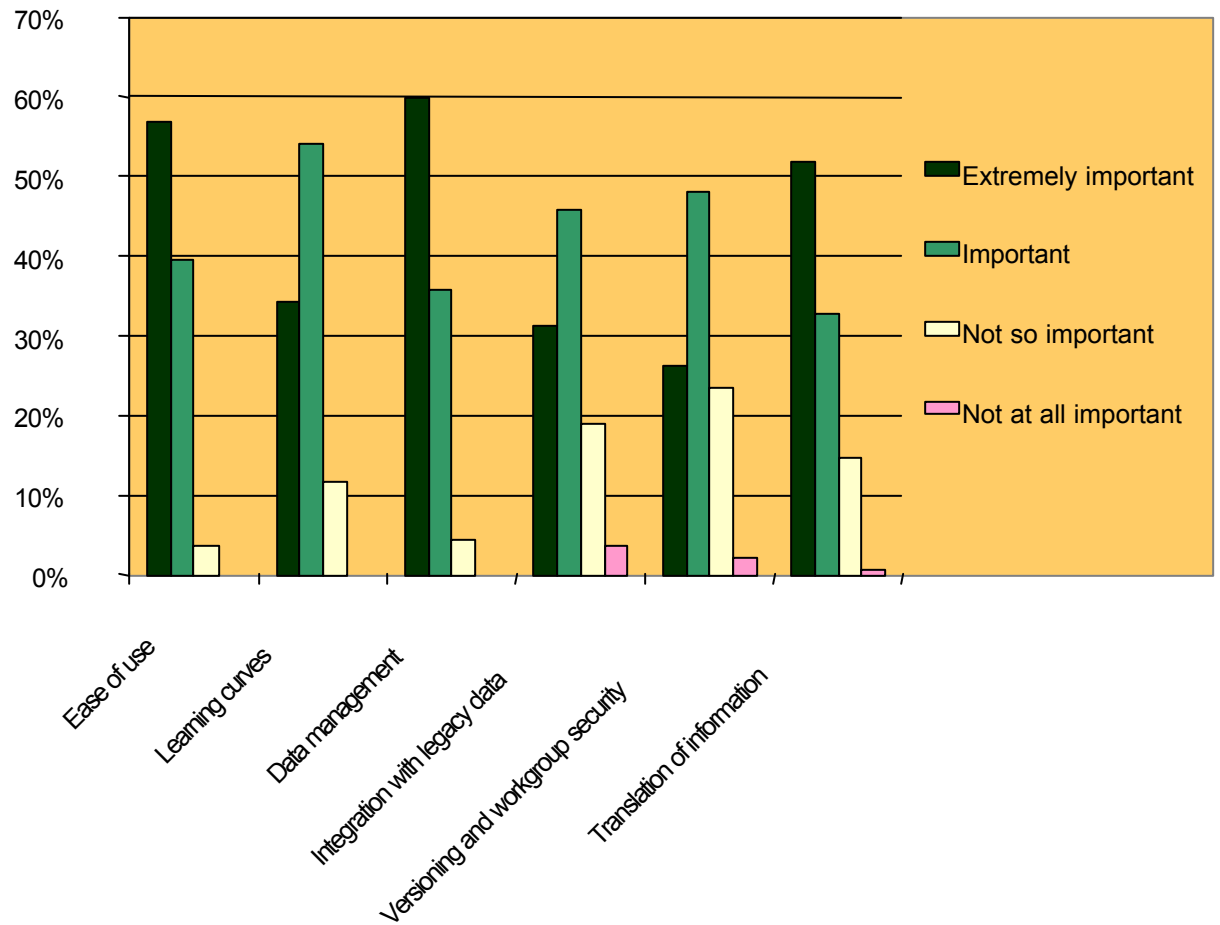
How much have your 3D plant design systems improved project productivity?



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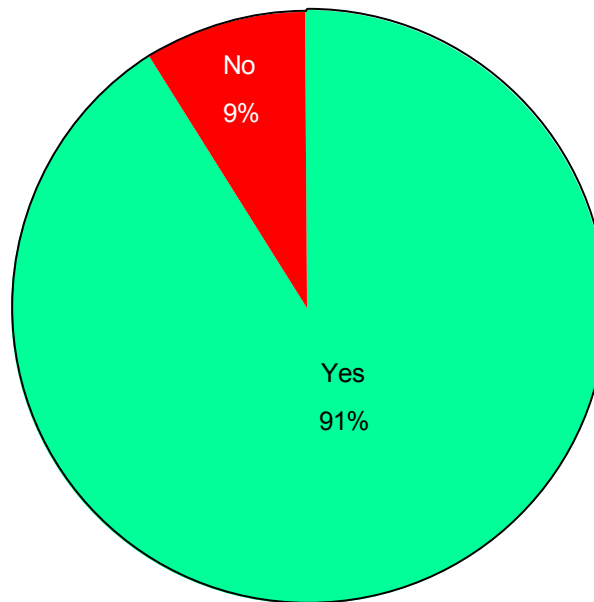
What are the most important requirements of a 3D system?



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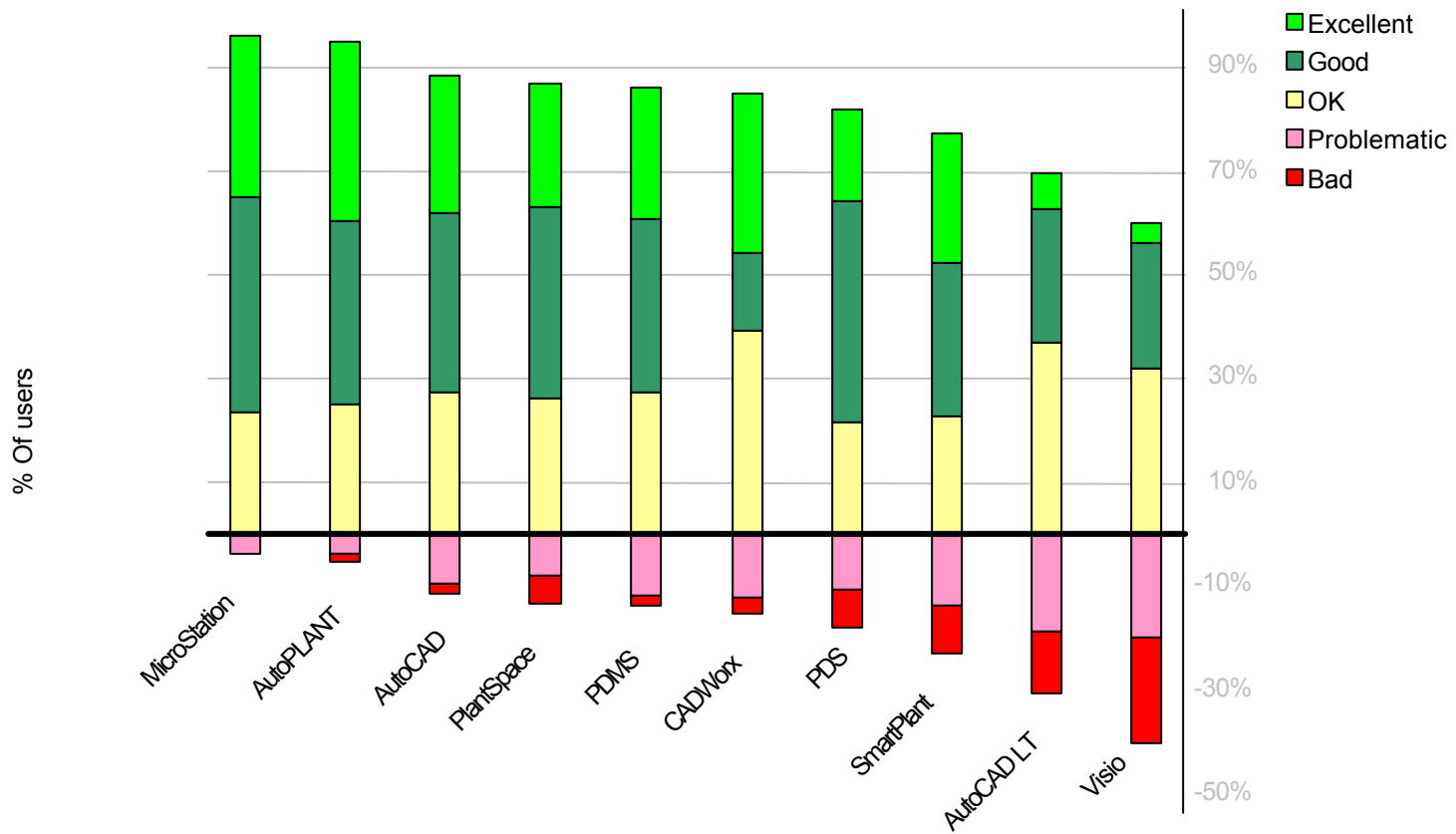
If using a 3D plant design system were not mandatory for a LARGE project, would you still use it?



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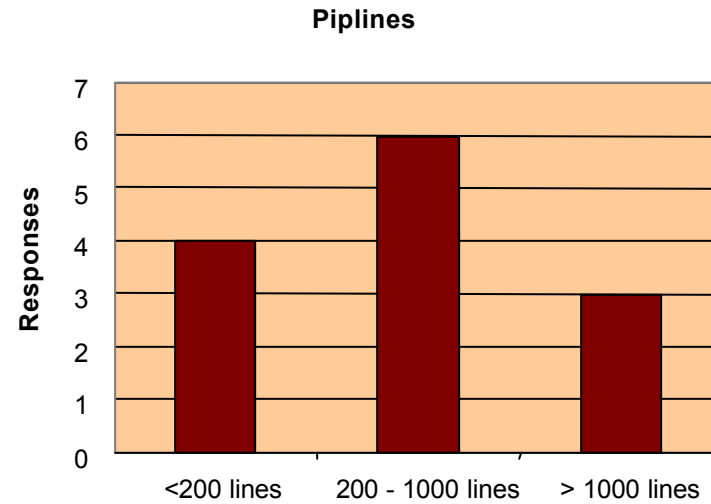
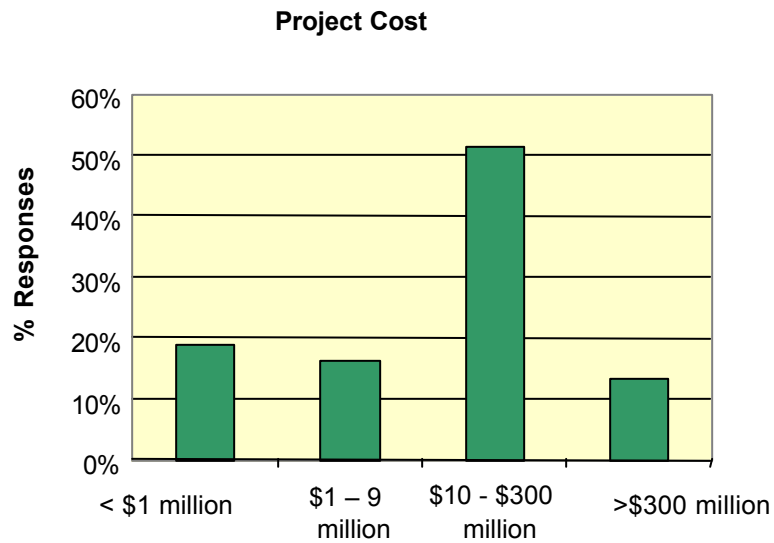
How satisfied are you with the following system's ability to handle SMALL projects?



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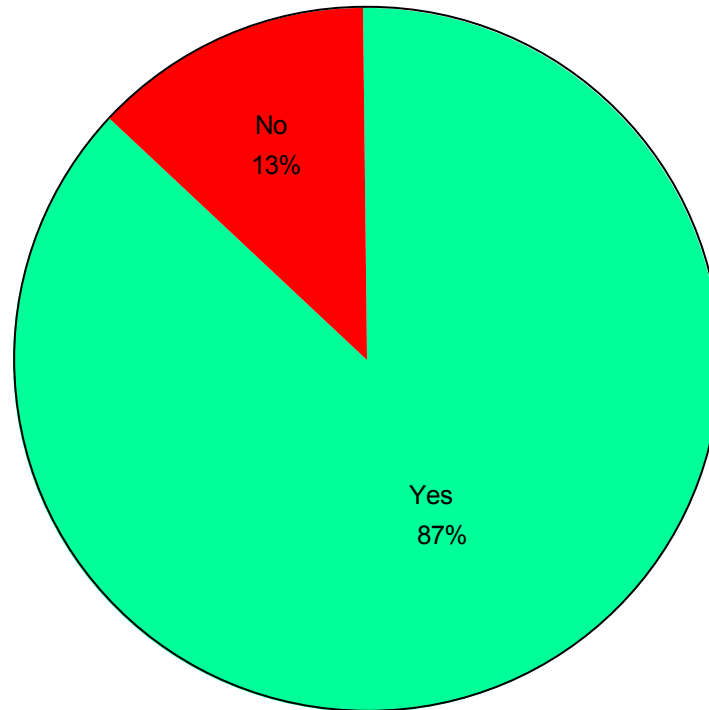
What do you consider to be a SMALL project?



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If using a 3D plant design system were not mandatory for a SMALL project, would you still use it?



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What percentage of your company's work continues to be done using 2D plant design systems?

