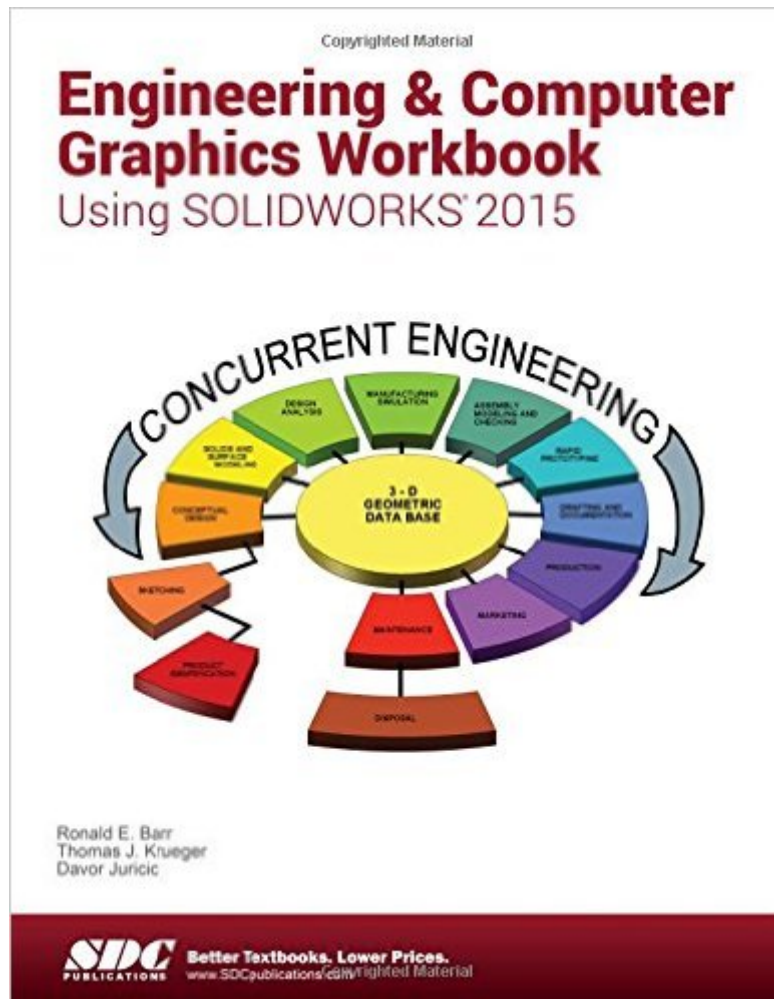# Engineering & Computer Graphics Workbook Using SOLIDWORKS 2015

Synopsis

Engineering & Computer Graphics Workbook Using SOLIDWORKS 2015 is an exercise-based workbook that uses step-by-step tutorials to cover the fundamentals of SOLIDWORKS 2015. The intended audience is college undergraduate engineering majors, but it could also be used in pre-college introductory engineering courses or by self learners. The text follows an educational paradigm that was researched and developed by the authors over many years. The paradigm is based on the concurrent engineering approach to engineering design in which the 3-D solid model data serves as the central hub for all aspects of the design process. The workbook systematically instructs the students to develop 3-D models using the rich tools afforded in SOLIDWORKS. The exercises then proceed to instruct the students on applications of the solid model to design analysis using finite elements, to assembly modeling and checking, to kinematic simulation, to rapid prototyping, and finally to projecting an engineering drawing. The workbook is ideally suited for courses in which a reverse engineering design project is assigned. This book contains clear and easy to understand instructions that enable the students to robustly learn the main features of SOLIDWORKS, with little or no instructor input. Table of Contents Computer Graphics Labs: 1. 2-D Computer Sketching I 2. 2-D Computer Sketching II 3. 3-D Solid Modeling of Parts I 4. 3-D Solid Modeling of Parts II 5. Assembly Modeling and Mating 6. Analysis and Design Modification I 7. Analysis and Design Modification II 8. Kinematics Animation, Creating Views and Rapid Prototyping 9. Section Views in 3-D and 2-D 10. Generating and Dimensioning Three-View Drawings Appendix A: Example of a TitleBlock with Dimensions

Book Information

Perfect Paperback: 250 pages

Publisher: SDC Publications; Workbook edition (July 8, 2015)

Language: English

ISBN-10: 1585039306

ISBN-13: 978-1585039302

Product Dimensions: 0.8 x 8.2 x 10.8 inches

Shipping Weight: 1.4 pounds (View shipping rates and policies)

Average Customer Review: 3.5 out of 5 stars See all reviews (2 customer reviews)

Best Sellers Rank: #316,976 in Books (See Top 100 in Books)   #32 in Books > Computers & Technology > Graphics & Design > CAD > Solidworks   #332 in Books > Computers & Technology > Graphics & Design > Computer Modelling   #492 in Books > Arts & Photography > Architecture >

Customer Reviews

I have always reviewed my favorite SolidWorks books on but I recently decided to try and review them all Consumer Reports style 1) just in case one made a suitable alternative to what I've used these 12 years teaching and 2) because nobody else has. After all, you can find a ranking for everything else in life, from cars and stereos to universities. So why not SolidWorks textbooks? Perhaps it was for fear of offending within a tight knit community, which prompts this statement in my preemptive defense. I started this project hoping to praise, and even now hope my criticisms drive improvements where they are needed. Of course, there are also some quality texts out there. Only today's this isn't one of them.For the harried, I'll abbreviate my conclusions on this book here. It appears there was a time this book was about as good as any but the years, the innovations that have passed it by and the lack of upkeep have left it shabby. While it has its good points – plenty of them - maintenance really has been slipshod over the decade and a half of its existence. At this point little short of a major overhaul, (dare I hope a veritable reinvention as a lean, just the facts guide?) will redeem it. Below find more general remarks and detail beyond that.While personally I would like a SolidWorks text to begin with a general orientation, say an overview of the user interface and the general structure of the software, such perspective can also be provided on the fly in the course of introductory exercises. This book begins with scant overview and that is out of date.Still, just as two engineers will model the same part differently, educators will vary in their approach in teaching how to model. And the approach here is different, different old fashioned to some ears, but starting with a grid – essentially electronic graph paper – for sketching maybe isn't a bad idea. Counting squares is how we were taught in the olden days and like everything else about hand sketching remains relevant. And I quite like the exercises, drawing a manhole cover, one of those shelf brackets with a tab that locks into a slot, a jack stand, disposable tape dispenser, pulley, interesting gusseted brackets, and many rotation-ally symmetric parts. Familiar objects with interesting features that offer appropriate modeling challenges – an excellent approach. On the other hand, there are no truly challenging, stretch goal parts.That this is a thin book also differentiates it from the 800 page competition. Give me short and sweet any day as the bard said. Not that brief done well comes simply by cutting pages. Getting the whole of SolidWorks across in a mere 250 pages where others require 1000's would be remarkable, a veritable equivalent to poetry in the careful crafting required, not a word out of place etc. So, do these guys pull it off? For now let's just say Robert Frost needn't be looking over his

shoulder.One way this text accomplishes its brevity is by foregoing step by step illustrations of user interactions with the software, a brave and not necessarily wise step back from the sort of Ã¢Â Â" what some would call spoon feeding - found in other texts and YouTube tutorials. Unexpectedly it simultaneously gobbles up precious space with oversize text, less than tight editing, and by endlessly repeating certain basic instructions such as how to open and save files, an oddly consistent note in such a patched up text. I'm picturing a car with matching wheel covers but varicolored junkyard fenders and doors.Edition InflationLike a lot of SolidWorks texts, this one puts out a new edition with each SolidWorks release, which seems pretty ambitious of Barr and company, but is a great way of selling books. Ã¢Â ÂœNo, sorry, you canÃ¢Â Â™t save 90% buying a two year old text online, itÃ¢Â Â™s old, out of date, not shiny and new. Now this yearÃ¢Â Â™s editionÃ¢Â Â|Ã¢Â Â• has actually been updated, right? Um, sort of. (Hint: go ahead and save the 90%).For starters, while no text executes an annual update perfectly, this one is remarkable for its paucity of changes over the last decade and a half. Yes the authors might say, but if the text ainÃ¢Â Â™t broke, why fix it? Besides, as the senior senior professor who hired me to teach undergraduates said, the goal is to teach engineering communication, not some particular CAD program. And finally, yes, I myself tend to ignore SolidWorksÃ¢Â Â™ latest, often gimmick laden bells and whistles.Accordingly, all these years the table of contents has hardly budged. The authors have chosen to change the text in place, i.e. without shifting page numbers, presumably so instructors donÃ¢Â Â™t have to adjust their syllabus and assignments every year as they do with other texts Ã¢Â Â" a real convenience I confess.But thereÃ¢Â Â™s a limit to this approach. Every text, like any product, has room for improvement, and an authorÃ¢Â Â™s embrace (or not) of this reality is telling. After all, improvement is the ostensible motivation behind a new edition in the first place, so an authorÃ¢Â Â™s attitude toward, his embrace (or not) of salutary changes matters. Customers want and deserve practical innovations: Anti-lock brakes, side impact airbags, instructions that address the current user interface.What you actually get in this text is dadÃ¢Â Â™s old car. Thirty seven years later I can still smell the upholstery of my dadÃ¢Â Â™s Austin Nash Metropolitan (redolent of leaky hay loft), and see the drips in the Rustoleum paint job applied by us kids. It was a challenge for learning to drive in as you had to keep the rpms up before letting out the clutch at lights or it stalled. (I recall the very intersection). In short, dadÃ¢Â Â™s Metro was dated, demanding extra user attention, which is charming in retrospect but not a characteristic one seeks in a car or software guide when just learning. (DonÃ¢Â Â™t get me wrong. In physics, engineering, and yes even drafting a classic text can be just the ticket. By all means pick up an old edition of Ã¢Â ÂœTechnical DrawingÃ¢Â Â• by Giesecke).As it happens, the first thing that struck me upon

opening this text was that the instructions matched how I used to execute commands a decade and a half ago. You can still mostly operate the software this way but users don't because it's clumsy by comparison. What's missing is integration of three current primary user interface elements: the Command Manager (introduced in 2004), Property Manager, (introduced in 2001) and the Context Toolbar (introduced 2008). (As you'll see there's also a forth). While no fan of specialized terminology for its own sake, by my experience these tools and the terms referring to them have served the SolidWorks community well these last 7, 11 and 14 years. Any text for sale new, let alone one claiming currency, needs to clearly address these tools.I mean, not even the manual to dad's old car referred to it as a horseless carriage, with maintenance tips for the whip (accelerator), reins (steering mechanism), and feedbag (gas tank). And yet this text refers merely to "toolbar" or "tab" when what's meant is the multi-tabbed, multi-toolbar Command Manager. Next, the complex user interface by which we define the geometry being created gets the generic moniker "menu," specify thta it's the one "near the Feature Manager," instead of calling it the Property Manager. Last comes the scavenger hunt for what used to be right mouse click menu commands and now appear in a pop-up toolbar.(Speaking of horse and buggy jokes, dad's Metro did accommodate a hand crank start. He had to remount the radiator some 4 inches higher to access it, but one afternoon he hand crank started his beloved transportation. That demonstration complete though, he never felt compelled to repeat the chore, even though we thought it was great fun).So, what exactly is the command manager and what's the big deal about it? The command manager is a sort of super toolbar. With it SolidWorks took the scattered 10 or so most often used toolbars: sketch, feature, assembly etc. and overlaid them, with tabs for selecting which to make visible – not unlike in Microsoft office in function, only done well. This simple, clever organizational innovation freed up precious screen space while simultaneously freeing the user from the task of juggling via the View menu which toolbars to show or hide and frequently getting it wrong. Unfortunately, it is precisely with guidance on this toolbar juggling that this text opens taking one on a pointless trip down unpleasant memory lane.The Property Manager is essentially the user interface of the command being executed. For instance if extruding a sketch to form a solid, it's where the user enters the directions and distances to extrude. It is called a "manager" in part because of the complicated job it performs and in part because it resides where the other "managers" do. Namely, it has a tab between the Feature Manager and the Configuration Manager on the left side of the screen. And this text even agrees saying, "The 'Extrude' menu appears in the Feature Manager area,"

except for insisting on calling it a â€œmenuâ€• which it definitely is not. â€œCommand Formâ€• would be a decent description, i.e. a form containing fields and check boxes (dare I say properties?) relevant to the command being executed.As stated in a 2001 Cadalyst review of the software when this feature was knew, â€œThe PropertyManager design editor opens automatically with many sketch operations and displays all design properties and parameters previously found in dialog boxes...[displaying] next to a model while you create itâ€¦â€œ**Cadalyst, SolidWorks 2001: A design odyssey, 1 Jun, 2001, By: Jeffrey RoweSo how about we just agree to call it the Property Manager like everybody else? It has to be called something after all, and consistency is a virtue in communication as in engineering.Similarly, the problem with failing to address the Context Toolbar is an ongoing confusion of terminology and procedure. To edit a sketch the text says, â€œRight mouse click on this Sketch1 label and a short pull-down menu appears.â€¦ Left mouse click on the Edit Sketch option.â€• Except that what the user need actually do is ignore the pop-up menu (it has never been pull down) and instead click the edit sketch icon in the Context Toolbar above it - which icon by the way looks like a pencil with a hand over it.Or, if you are big on letting the student figure out which icon to use, you might instruct him that â€œa small note pops up to identify each tool icon that you pause your cursor overâ€• - and to figure it out. What is referred to here is none other than the inexpressibly helpful "Tooltip" that briefly explains any menu choice, icon, button or user entry field you hover your cursor over. Mind you, that while this textbook makes no mention of Tooltips, the text quoted above which remains accurate today is from a SolidWorks 1997 Help file.Finally, to edit sketch1 what you probably want actually to do is left mouse click it in the first place since that displays only the Context Toolbar which contains the command you actually wanted.The single greatest command launch oddity of this text is probably one of the first, the oft repeated sequence: select your plane, specify your view, click the sketch command. Itâ€™s half backwards. Now, first selecting a plane to sketch on is vital, bravo. What next follows logically though is launching sketch, i.e. the two are inexorably linked. For an old school analogy, the equivalent would be â€œtape down your sheet of paper, make sure the lighting is good, and draw,â€• versus â€œtape down your sheet of paper before you draw so it doesnâ€™t shift position on you. By the way, you need to be able to see what youâ€™re doing.â€• The primary point to communicate is that the plane defines the sketch location. The student really needs to understand that. Sure, like good lighting, orientation of the screen display is relevant, but in an entirely different way. In fact while normal to the sketch plane is ordinarily how we draw, the user may also reasonably choose to view the sketch plane at an angle as he works. All that surprises me is that the odd sequence advised actually

works.InaccuraciesIn the introduction the author describes the color codes SolidWorks uses to communicate the status of sketch entities: Cyan, Blue, Black and uh Yellow Ã¢Â Â" this last a relatively new color for indicating a problem. What happened to red, the original and still a current color code for problems? Sloppy editing? CÃ¢Â Â™mon guys, I understand the challenge of keeping current with the software releases. And IÃ¢Â Â™m unsure if having two alarm colors matters. But how do you simply drop one from the textbook when anyone using the program couldnÃ¢Â Â™t miss it?Then there are step by step instructions that are just plain wrong. In the instructions for creating a reference geometry axis to make the Hand Wheel in chapter 3, two different methods are conflated mid paragraph: 1) point and plane and 2) planes intersection. Which is too bad because not only is it confusing, but an opportunity to introduce both as valid alternatives is lost. By the way, there is nothing new about either, which makes it the more curious that the 2007 edition referred only to approach 1 Ã¢Â Â" though bobbling the details there too by suggesting that SolidWorks accepts a point and non-planer surface to define an axis.Wishy-washy on the Good StuffA curious aspect of this text is the tentativeness with which the authors sometimes refer to the software as if they were unaware of the default configurations in which it ships. Perhaps they are wary of their own text keeping up with yearly variations? For instance they go to some trouble suggesting what a drawing template might look like Ã¢Â Âœif one has not been provided.Ã¢Â Â• Well, SolidWorks out of the box has come with drawing templates sporting an identical title block layout for as long as I can remember. Perhaps there was a reasonable concern at the dawn of SolidWorks which IÃ¢Â Â™ve blocked out and which here fossilized into a fretful habit. Please, remove that fossil.The introduction to Ã¢Â ÂœSketching PlanesÃ¢Â Â• on page I-4 could be briefer, or flowerier if it isnÃ¢Â Â™t going to be brief. IÃ¢Â Â™ll pick on the last sentence.Ã¢Â ÂœThe [sketch] surface does not necessarily have to be parallel to one of these three principle planes.Ã¢Â Â• How about instead:Ã¢Â ÂœThe great thing about sketching on a part surface or an added plane is precisely that it enables you to begin a feature at any useful offset and orientation.Ã¢Â Â•That is, yeah for real world modeling needs. LetÃ¢Â Â™s take what easy modeling SolidWorks offers and run with it. Please, fear of fabulous functionality can hardly be best practice. Be deliberate by all means, but not timid. Thou shalt embrace capability Ã¢Â Â" not apologize for it.The just plain oddest approach taken by this text is with drawings. For starters, students arenÃ¢Â Â™t told they are making drawings, they are copying their models onto Ã¢Â Âœtitle blocksÃ¢Â Â• or Ã¢Â Âœtitlesheets.Ã¢Â Â• Now, IÃ¢Â Â™m used to quirks in SolidWorks texts written by academics rather than practicing engineers, but here the disconnect from the machine shop is staggering.Further, for half a dozen exercises the text recites which

buttons to push for generating some standard views and a section as if doing so by itself generates a valid set of fabrication instructions. This text offers not a word about how to generate a view from a particular angle, to say nothing about which view a user might choose to best communicate his design. What an engineering graphics workbook ought to say is that an engineer should select for his front view which ever view point communicates the most about his part Ã¢Â Â" then leverage that with which ever, and how ever many supplementary views are needed to complete the picture. It is irresponsible to allow the software to choose views automagically instead by checking the Ã¢Â ÂœCreate multiple viewsÃ¢Â Â• - though not uncommon in textbooks. Still, as I like to tell students, youÃ¢Â Â™re the one with the brain. You choose the view for the silicon idiot, not the other way around. And shame on the SolidWorks software engineers for creating this trap for the ignorant in the first place.Much also needs to be taught about annotating drawings, how to convey design intent and which views are most suitable for what information. Features need to be dimensioned in views in which they appear true size and shape, as is done in this text but with no accompanying explanation. For example, dimension round holes in the view that shows them as circles. In this view by the way, the SolidWorks Hole Callout command will automatically and correctly annotate them for you. Otherwise, all bets are off. But, instead of helpful commentary such as these about real graphical communication challenges, students are shown how to change text size and leader lengths on arrows, which fiddling - if they ever try it at work - will get them fired.Good Stuff & Best Practices Left OutNowhere have I found an example of extruding an open profile sketch as a Ã¢Â Âœthin featureÃ¢Â Â• to create a consistent thickness shape such as for a sheet metal part. The Wing Base in chapter 5 would have been a natural place for introducing this approach as there are not one but two such parts. Nor do I find even a discussion of closed versus open sketch profiles which is about as fundamental as you can get.The author appears inordinately fond of creating fillets in models by adding them to the sketch instead of adding them separately as solid features, contrary to generally agreed best practice. Same for patterns. In fact he seems inordinately fond of expressing all his geometry in a single complex sketch Ã¢Â Â" a standard rookie mistake Ã¢Â Â" instead of breaking the task into pieces.Introducing the Sketch Tools Menu in chapter 2, IÃ¢Â Â™m puzzled at ignoring the Split Entities command which I use frequently. It separates a single line or arc into pieces, which I use frequently when I want to turn part of that sketch entity into construction geometry. (For example I draw a circle, but only part of it will actually form my solid). Meanwhile the now redundant Extend and Trim get top billing. On the positive side, the various sketch move commands are also ignored - as their unreliable selves well deserve.ConclusionWhat are the repercussions of these outright errors in the text? I mean, every

text has errors, what's the harm? Well, I think back to my first calculus class in which we were using a new (otherwise fine) textbook which had lots of typos. Mind you, I was trying to learn the strange logic of moving exponents to the front of expressions and visa versa - and a good 10 percent of the solutions provided had typos. It wasn't hard to entirely misinterpret what was going on. In short, errors in textbooks are bad, and those that persist are inexcusable.I don't think I'm being too hard on this book. On the contrary, distracted by the innumerable little failings, a desire to say something nice, and recognizing that widely different approaches are a good thing, I could argue that I've rather danced around the basic fact of its poor quality. A reviewer who was lazier, or perhaps one more considerate to the learning public, would have quickly condemned it and moved on.In short what this book requires at a minimum - and pronto - is a long overdue update plan and a sentence by sentence implementation. Update the book to reflect the "current" user interface. Correct, clarify, and consider re-prioritizing content in a way that hasn't been done in a decade. While you're at it, eliminate most of the boiler plate instruction at each exercise start and conclusion. At halfway through the book I'd hope this particular hand holding could stop " and the space freed up be dedicated to some real teaching. That is, a veritable rewrite of this book is in order, one that values clarity of communication over fealty to previous editions. Existing table of contents and page numbers be damned.

Good

Engineering & Computer Graphics Workbook Using SOLIDWORKS 2015 Engineering & Computer Graphics Workbook Using SolidWorks 2014 Engineering & Computer Graphics Workbook Using SolidWorks 2012 Engineering & Computer Graphics Workbook Using SOLIDWORKS 2016 SOLIDWORKS 2015 and Engineering Graphics: An Integrated Approach Engineering Graphics with SolidWorks 2015 and Video Instruction Advanced Graphics Programming Using OpenGL (The Morgan Kaufmann Series in Computer Graphics) SOLIDWORKS 2016 and Engineering Graphics: An Integrated Approach Engineering Graphics with SOLIDWORKS 2016 and Video Instruction SolidWorks 2014 and Engineering Graphics: An Integrated Approach Engineering Graphics with SolidWorks 2010 and Multimedia CD Engineering Graphics with SolidWorks 2014 and Video Instruction The Art and Science of Digital Compositing, Second Edition: Techniques for Visual Effects, Animation and Motion Graphics (The Morgan Kaufmann Series in Computer Graphics) Mobile 3D Graphics: with OpenGL ES and M3G (The Morgan Kaufmann Series in Computer

Graphics) Official Guide to Certified SolidWorks Associate Exams - CSWA, CSDA, CSWSA-FEA (SolidWorks 2015, 2014, 2013, and 2012) CSWE - Certified SolidWorks Expert Preparation Materials SolidWorks 2010 - 2015 In Search of Graphics: Adventures in Computer Art (A Lothrop computer book) Engineering Analysis with SOLIDWORKS Simulation 2015 Computer Graphics Using OpenGL (Hardcover, 2006) 3rd EDITION Official Certified SolidWorks Professional (CSWP) Certification Guide with Video Instruction: SolidWorks 2012-2014