

Making the case: Calculating ROI on defect management software

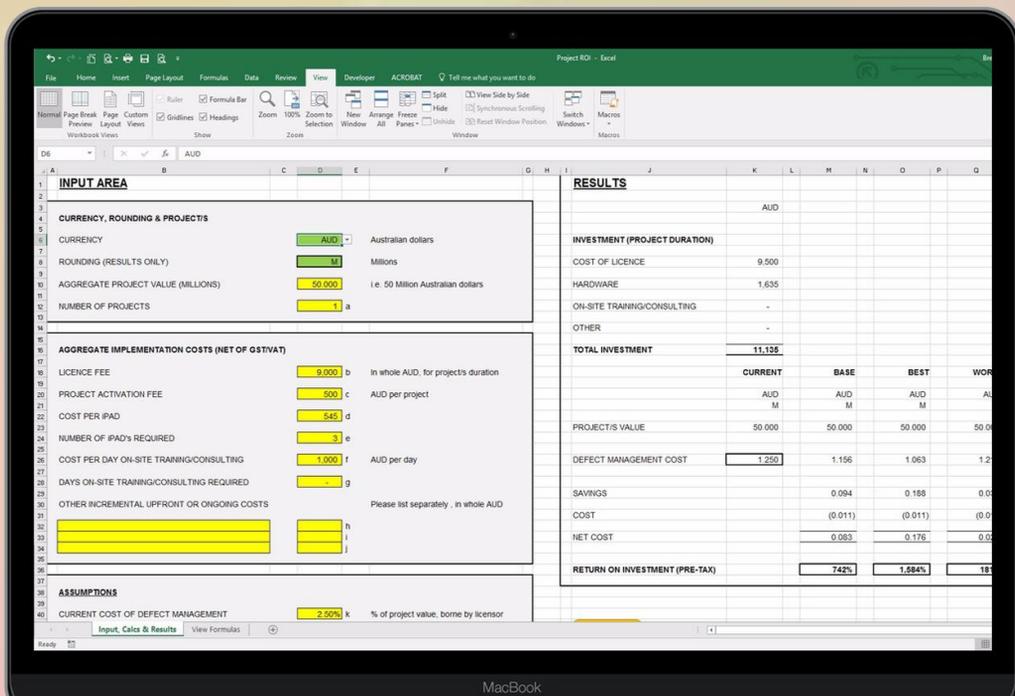


Table of Contents

1. Introduction	2
2. ROI Explained	3
3. Inputs, Assumptions & Other Considerations	5
4. Completing the Spreadsheet	13
5. Analysis & Conclusion	25

1. Introduction

Even though this spreadsheet is based around the **ACCEDE Defect Management System** licence fee structure there is no reason why it could not be used to evaluate other defect management software you may be considering.



So let's start with the basics!

2. ROI Explained

Return on investment or **ROI** is a profitability ratio that calculates the profit of an investment as a percentage of the original cost. In other words, it measures how much money was made on the investment as a percentage of the purchase price. It shows investors how efficient each dollar invested in a project is at producing a profit. Investors not only use this ratio to measure how well an investment performs, they also use it to compare the performance of different investments of all types and sizes.

For example, an investment in stock can be compared to one in equipment. It doesn't matter what the type of investment because the return on investment calculation only looks at the profits and the costs associated with the investment.

$$\text{ROI} = \frac{\text{Return on Investment}}{\text{Investment Cost}} = \frac{\text{Investment Revenue} - \text{Investment Cost}}{\text{Investment Cost}}$$

Now we're not trying to make accountants out of you and you don't need to be an Excel guru either so bear with us.

2. ROI Explained(cont'd)

Providing an estimated ROI is a great way to support your business case and secure approval for funding a Defect Management System license, hardware (iPads) and associated costs.

It's likely you are the one evaluating tablet-based defect management systems because you are heavily involved in the mostly manual process of collecting, recording and managing defect items (into Punchlists or Snaglists), distributing them to responsible subcontractors and taking them off the list when rectified.

You are probably recording items on scraps of paper during on-site inspection, re-keying into Excel Spreadsheets, attaching photos taken during inspection on your mobile phone and emailing lists to subcontractors. So relax, you already know enough about Excel to get through this ROI spreadsheet – our goal is to make your job easier and improve project/company profitability ([click here to watch our video](#)).

But before diving into the mechanics of the ROI spreadsheet, you will need to do some preparation.

3. Inputs, Assumptions & Other Considerations

A. Currency and Reporting Preferences

- i) Currency options available are Australian dollars (AUD), United States dollars (USD) and Great Britain pounds (GBP).
- ii) Rounding options available are Millions (M) or Thousands (K).

B. Number of Projects/Licences and Aggregate Project Value

Whether considering a single or multiple project licences, you will need to enter:

- i) the aggregate project value (i.e. cost to main contractor of the projects the defect management system will be used on), and
- ii) the corresponding number of projects.

3. Inputs, Assumptions & Other Considerations (cont'd)

C. Investment Cost

i) Licence fee quote/estimate

If you are preparing a business case for management consideration, it's likely you will have at least 2-3 quotes from shortlisted suppliers. Our Project ROI spreadsheet requires you to enter the licence fee plus any associated charges quoted by the licensor (e.g. Project Activation Fee).

These ought to be readily available from the quotes/estimates received and must be based on the time frame of use of the defect management system on the intended projects.

For example, with a standalone **ACCEDE** project license the minimum term is 12 months which would be sufficient time to complete defecting most construction projects. Please ensure you understand all elements of your quote and how they relate to the project or projects you plan to use your defect management system on.

3. Inputs, Assumptions & Other Considerations (cont'd)

C. Investment Cost (cont'd)

ii) Hardware i.e. how many new iPad's/Tablets you will need

This is another easily quantified cost. Some businesses will already have sufficient iPad's/ tablet devices on hand for inspectors to carry out on-site inspections and identify/document defects and complete check lists.

However, should you not have sufficient or any tablet devices you will need to consider the unit cost and how many new devices you will need to purchase to maximise the productivity benefits of a defect management system.

Be sure not to under-estimate how many you will need for the projects under consideration.

iii) Training/consulting

Over the life of your project/s you may consider additional days of on-site user training or consulting. An **ACCEDE** quote will provide our current daily rates for such add-on services.

3. Inputs, Assumptions & Other Considerations (cont'd)

C. Investment Cost (cont'd)

iv) Other incremental upfront or ongoing costs

Any other costs you consider appropriate to the successful implementation of a defect management system need to be included in the investment cost. Examples of such incremental implantation/ongoing costs include out-of-pocket costs associated with on-site training/consulting and internal cost allocations (e.g quality management, IT charges, training costs).

D. Investment Revenue

As you have probably already realised, there are not going to be any revenues arising from implementing a defect management system. But this doesn't mean it isn't possible to calculate the ROI. Instead there are cost savings over existing manual defect management processes.

Don't let Management try and tell you they can't afford the outlay associated with a tablet-based defect management system. You will need to clearly articulate the time saving and productivity benefits that arise during the critical close-out stage of a project leading into handover.

3. Inputs, Assumptions & Other Considerations (cont'd)

D. Investment Revenue (cont'd)

Here's some things to consider to quantify cost savings on your projects.

i) **Current cost of defect management**

Does your business know now what it costs to create and manage defect lists? Chances are if you work for a top tier main contractor this may have already been costed and is known by your management accountant or business analyst.

Medium sized businesses may not know this cost. Typically, it would be expressed as a % of project value.

Check with your accounting department to see if they have this KPI – you will need it later when we start using the spreadsheet.

If your business is yet to quantify this cost never mind. Research led by Professor Marton Marosszaky at the Australian Centre for Construction Innovation (University of NSW) identified the following in respect of the impact of defects:

3. Inputs, Assumptions & Other Considerations (cont'd)

D. Investment Revenue (cont'd)

i) Current cost of defect management (cont'd)

- On average, the total cost of defect rectification ranges between 4% and 6% of construction expenditure.
- The rectification process is highly management intensive due to the requirement for checking, recording, coordinating, reporting and signing-off reworked activities.
- The indirect management costs are as much as direct rectification costs. The administrative cost is substantially borne by head-contractors while the direct cost of rework is borne by the subcontractors.

In summary, average cost of defect rectification using traditional methods is 5% with half of this (2.5%) borne by the head contractor in administrative burden.

3. Inputs, Assumptions & Other Considerations (cont'd)

D. Investment Revenue (cont'd)

i) Current cost of defect management (cont'd)

Consider a \$20M construction project; total cost of defect rectification is (on average) \$1M with the main contractor's cost being (on average) \$0.5M. This is a significant cost but one that is rarely costed in the closing stages of a project i.e. just prior to handover and completion.

How does your business compare?

This is one of the key factors in determining the cost savings. Use the 'guesstimate' provided by your accountants/analysts or absent this revert to the research findings.

ii) Expected productivity improvement

The Expected Productivity Improvement represents the % of time costs saved by using a tablet-based defect management system.

3. Inputs, Assumptions & Other Considerations (cont'd)

D. Investment Revenue (cont'd)

ii) Expected productivity improvement (cont'd)

For example, consider the number of defects identified, recorded and emailed to responsible sub-contractors in say a four-hour period using your current traditional/manual system - this might be 186 defect items. If during your free trial you managed to identify, record and email 200 defect items, this equates to a productivity improvement of approximately 7.5% (i.e. incremental items (14) divided by current system items (186)).

During your free trial period we strongly recommend trying to quantify the productivity improvement by measuring your defects per hour rate under your existing/manual processes and when using a tablet-based defect management system.

That's everything you need to calculate the ROI of implementing a defect management system.

Now it's time to enter all the information gathered above into the spreadsheet and find out what the ROI is for your business.

4. Completing the Spreadsheet

A. Open the file “ROI_Calculator.xlsm”

- i) We suggest first closing all other Excel files.
- ii) If not already downloaded, the Excel macro-enabled spreadsheet can be found at <http://accedeglobal.com/roi-calculator-and-user-guide/>

B. Overall requirements

- i) All inputs, calculations and results are performed/displayed on the tab labelled "Input, Calcs & Results".
- ii) You will not be able to to change or enter data into any cells other than those highlighted.
- iii) **Green** cells represent dropdown menus from which predetermined values can be selected.
- iv) **Yellow** cells are for data entry. Values relevant to your business should only be entered in the **yellow** cells.
- v) All other cells in the spreadsheet have been locked and cannot be edited.

4. Completing the Spreadsheet (cont'd)

B. Overall requirements (cont'd)

- vi) Your company is likely to be entitled to GST/VAT credits so please enter \$/£ amounts on a net of GST/VAT basis (ask your Financial Controller or Accounting Manager if you are unsure). If not all amounts should be entered on a GST/VAT inclusive basis.
- vii) The tab labelled “View Formulas” is provided only for auditing purposes and is formatted to display formulas with print macros removed.
- viii) No calculations in the spreadsheet take into account the time value of money i.e. no values/amounts have been discounted. This is because the time spent defecting projects is typically less than 12 months.
- ix) Example costs are based on an Australian single project **ACCEDE** license and iPad 2's current in September 2016. Based on our experience of first time users of the **ACCEDE Defect Management System**, no additional training/consulting days or other upfront/ongoing costs have been included.

4. Completing the Spreadsheet (cont'd)

C. Input Area – Currency, Rounding & Project/s

A	B	C	D	E	F	G
1	INPUT AREA					
2						
3						
4	CURRENCY, ROUNDING & PROJECT/S					
5						
6	CURRENCY		AUD		Australian dollars	
7						
8	ROUNDING (RESULTS ONLY)		K		Thousands	
9						
10	AGGREGATE PROJECT VALUE (MILLIONS)		50,000		i.e. 50 Million Australian dollars	
11						
12	NUMBER OF PROJECTS		1	a		
13						
14						
15						

- i) Select your currency from those listed in the dropdown menu in **green highlighted** cell, D6 (see 3. A. (i) above).
- ii) Select your preferred reporting rounding factor for those available in the dropdown menu in **green highlighted** cell, D8 (see 3. A. (ii) above).
- iii) The spreadsheet caters for multi licence scenarios – please be sure to enter aggregate project values/costs in millions in **yellow highlighted**, cell D10, to ensure the ROI calculates correctly (see 3. B. (i) above).
- iv) If you are considering a multi licence scenario, please enter the number of projects that corresponds to the aggregate project value (step c above) in the **yellow highlighted** cell, D12 (see 3. B. (ii) above)

4. Completing the Spreadsheet (cont'd)

C. Input Area – Currency, Rounding & Project/s (cont'd)

- v) Enter 1 in yellow highlighted cell, D12, in a single project scenario so that the project activation fee is added to the licence fee.

D. Input Area - Aggregate Implementation Costs

	A	B	C	D	E	F	G
14							
15							
16		AGGREGATE IMPLEMENTATION COSTS (NET OF GST/VAT)					
17							
18		LICENCE FEE		9,000	b	In whole AUD, for project/s duration	
19							
20		PROJECT ACTIVATION FEE		500	c	AUD per project	
21							
22		COST PER IPAD		545	d		
23							
24		NUMBER OF IPAD's REQUIRED		3	e		
25							
26		COST PER DAY ON-SITE TRAINING/CONSULTING		1,000	f	AUD per day	
27							
28		DAYS ON-SITE TRAINING/CONSULTING REQUIRED		-	g		
29							
30		OTHER INCREMENTAL UPFRONT OR ONGOING COSTS				Please list separately , in whole AUD	
31							
32					h		
33					i		
34					j		
35							

- i) Enter the amount quoted for licence fees into the yellow highlighted cell, D18. Be sure to check that the number of licences quoted matches the number of projects entered in yellow highlighted cell, D12 (see 3. C. (i) above).

4. Completing the Spreadsheet (cont'd)

D. Input Area - Aggregate Implementation Costs (cont'd)

- ii) Enter the amount quoted for the Project Activation fee in **yellow highlighted** cell, D20. This must be the per project amount quoted (see 3. C. (i) above).
- iii) Enter the number of unit cost and number of iPad's you require (we recommend minimum spec iPad Air 2's or iPad Mini 2's but you may choose higher spec or Pro versions for other uses) in **yellow highlighted** cells, D22 and D24. Be sure not to under-estimate how many you will need for the projects under consideration (see 3. C. (ii) above).
- iv) Please enter the daily rate and estimated days on-site training/consulting required in **yellow highlighted** cells, D26 and D28 respectively (see 3. C. (iii) above).
- v) Any other costs you consider appropriate to include as aggregate implantation costs can be entered in **yellow highlighted** cells B32-34 (line item descriptions) and D32-34 (amounts) (see 3. C. (iv) above).

4. Completing the Spreadsheet (cont'd)

E. Input Area – Assumptions

Inputs in the Currency, Rounding & Projects and Aggregate Implementation Costs sections ought to be relatively simple to quantify. The inputs required in the Assumptions section are more subjective, requiring judgement based on user experience and the outcomes achieved from your free trial.

Because of their subjective nature, we have allowed for a range of productivity assumptions, being:

- Base case (most likely productivity improvement over current defect management practices)
- Best case
- Worst case

	A	B	C	D	E	F	G
36							
37							
38		ASSUMPTIONS					
39							
40		CURRENT COST OF DEFECT MANAGEMENT		2.50%	k	% of project value, borne by licensor	
41							
42		EXPECTED PRODUCTIVITY IMPROVEMENT					
43							
44		BASE CASE (MOST LIKELY OUTCOME)		7.50%	l		
45							
46		BEST CASE		15.00%	m		
47							
48		WORST CASE		2.50%	n		
49							

4. Completing the Spreadsheet (cont'd)

E. Input Area – Assumptions (cont'd)

- i) In **yellow highlighted** cell D40, enter your current cost of defect management (actual from your accountants/analysts or estimate based on industry research e.g. Professor Marton Marosszeky at the Australian Centre for Construction Innovation (University of NSW)) expressed as a % of project value. This is likely to be between 2%-3% for traditional/manual Excel spreadsheet/email systems (see 3. D. (i) above).
- ii) The Expected Productivity Improvement represents the % of time costs saved by using a tablet-based defect management system into **yellow highlighted** cell, D44 (Base Case) (see D (ii) above).
- iii) After settling on your Base Case expected productivity improvement, think of what could be possible if all users were motivated, fully engaged and supported by ongoing training i.e. everyone was an “expert user”. The productivity improvement under this scenario is the Best Case and in our example calculation, 15% (or 0.15) has been entered into **yellow highlighted** cell, D46 (Best Case).

4. Completing the Spreadsheet (cont'd)

E. Input Area – Assumptions (cont'd)

- iv) It always prudent to consider a Worst Case scenario, just in case user acceptance and productivity outcomes are lower than your expectations. In our example calculation, 2.5% (or 0.025) has been entered into **yellow highlighted** cell, D48 (Worst Case).

F. Calculation Area

	A	B	C	D	E	F	G
50							
51							
52		CALCULATIONS			Formulas		
53							
54		TOTAL COST OF LICENCE		9,500	b + (a x c)		
55							
56		HARDWARE COST		1,635	d x e		
57							
58		ON-SITE TRAINING/CONSULTING		-	f x g		
59							
60		OTHER		-	h + l + j		
61							
62		TOTAL LIFE OF PROJECT/S COST		<u>11,135</u>			
63							
64							
65		COST OF DEFECT MANAGEMENT (% OF PROJECT/S VALUE)					
66							
67		- BASE CASE		2.31%	k x (100% - l)		
68		- BEST CASE		2.13%	k x (100% - m)		
69		- WORST CASE		2.44%	k x (100% - n)		
70							
71							

This area shows some of the sub-calculations used in calculating the overall ROI that are not considered sufficiently important to show on the Results page (see 7.0 below). Labels to the right of each of the input cells are used to provide examples of the underlying formulas.

4. Completing the Spreadsheet (cont'd)

G. Results

I	J	K	L	M	N	O	P	Q	R
	RESULTS								
		AUD							
	INVESTMENT (PROJECT DURATION)								
	COST OF LICENCE	9,500							
	HARDWARE	1,635							
	ON-SITE TRAINING/CONSULTING	-							
	OTHER	-							
	TOTAL INVESTMENT	11,135							
		CURRENT		BASE		BEST		WORST	
		AUD		AUD		AUD		AUD	
		M		M		M		M	
	PROJECT/S VALUE	50,000		50,000		50,000		50,000	
	DEFECT MANAGEMENT COST	1,250		1,156		1,063		1,219	
	SAVINGS			0,094		0,188		0,031	
	COST			(0,011)		(0,011)		(0,011)	
	NET COST			0,083		0,176		0,020	
	RETURN ON INVESTMENT (PRE-TAX)			742%		1,584%		181%	

Results are shown in cells I1:R37. Please review and adjust rounding and base, best and worst case assumptions as appropriate.

4. Completing the Spreadsheet (cont'd)

H. Interpreting the results

The example above shows significant ROI's under each productivity scenario based on an **ACCEDE** license and a A\$50M project, including the purchase of 3 new iPad 2's.

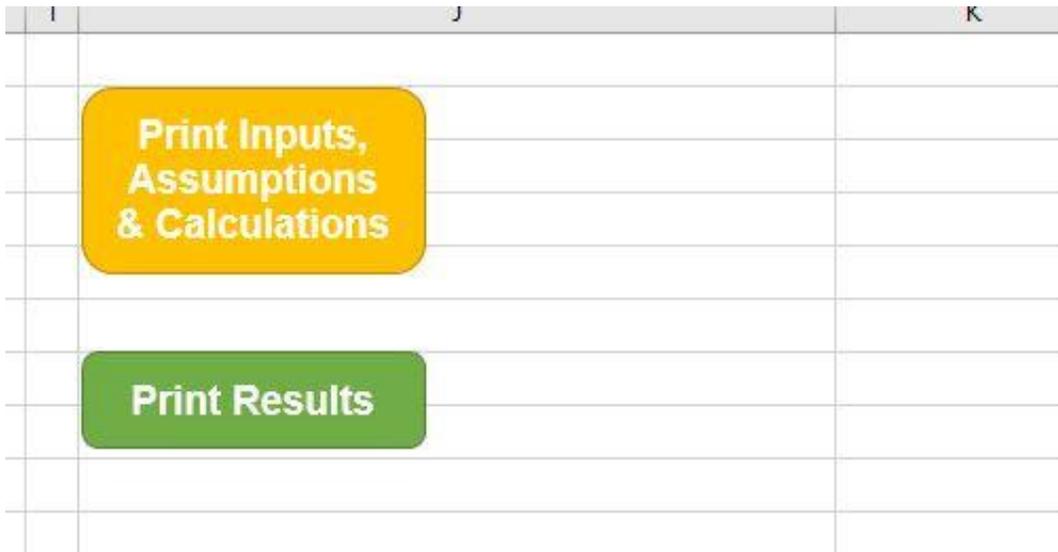
The base case estimates a productivity improvement of 7.5% over a current cost of defecting of 2.5% of project value (or A\$1.250M). This gives rise to defecting cost savings of A\$94K and after deducting the cost of investment (A\$11K), a net cost saving of A\$83K.

The ROI of 742% indicates the cost of an **ACCEDE** license and 3 iPads is recouped 7.42 times by the net savings on a pre-tax basis.



4. Completing the Spreadsheet (cont'd)

I. Printing



Printing has been set for A4 sized paper. Print macros define print ranges and page orientation. To print, activate the macros by clicking the buttons.



4. Analysis & Conclusion

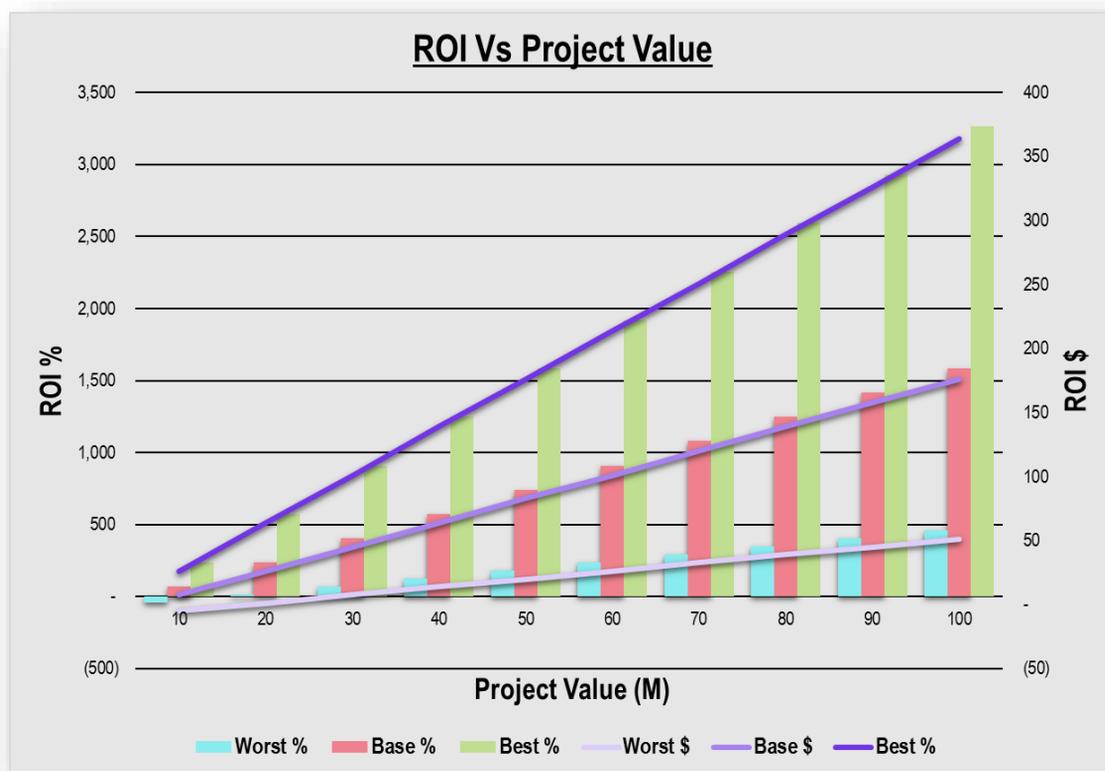
The example above appears very high and a seemingly impossible ROI, however this should not be viewed in the context of a capital investment ROI, which is typically much lower. What is often overlooked is the high cost of defecting using traditional methods and the relative low cost of implementing a tablet-based defect management system.

It's highly likely actual productivity improvements are closer to those presented in the 'best case' scenario, though we would rather present a conservative example than something over-optimistic.

In addition, because **ACCEDE** licenses are discounted as more project licenses are purchased, the ROI improves further in an enterprise license scenario, especially for tier one main contractors who work on large, high value projects.

Holding all inputs constant other than project value, the relationship between the project value and ROI outcomes are graphically represented as follows:

4. Analysis & Conclusion (cont'd)



Based on this analysis, we believe **ACCEDE** represents excellent value for money on projects with values of \$/£20M or greater.

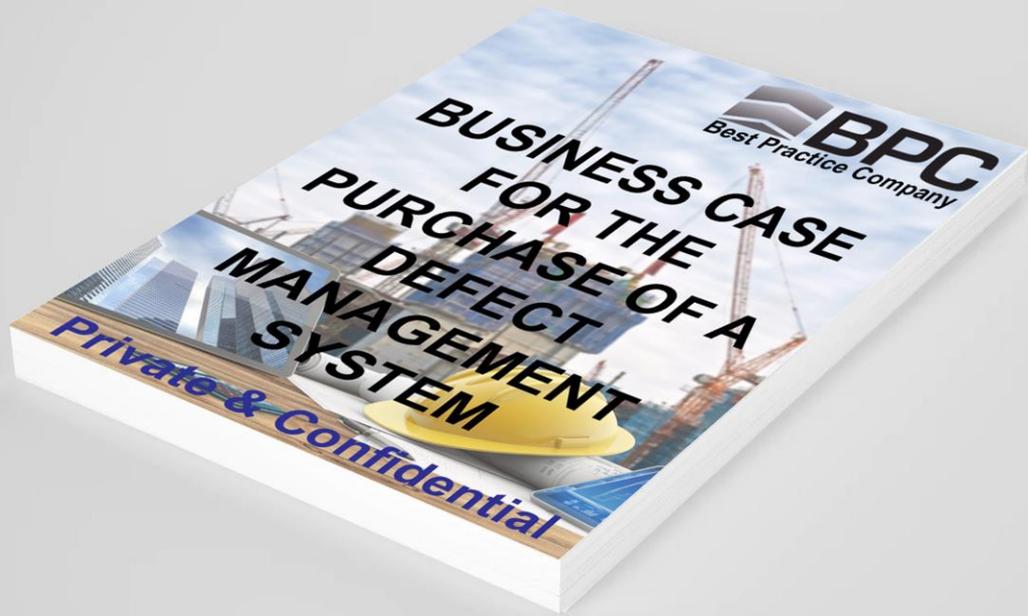
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