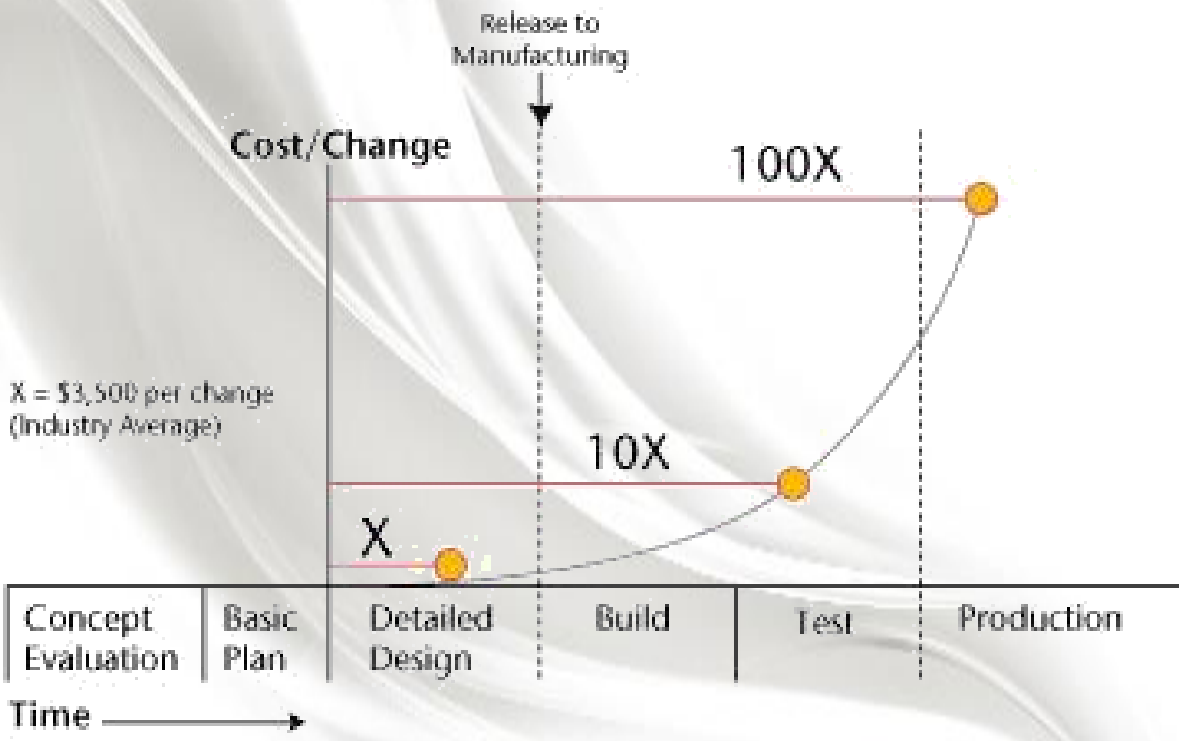
Totaro & Associates

Advisory Note

Cost of Design Changes Need to be Factored to Avoid IP Infringements

by Philip Totaro, CEO of Totaro & Associates www.totaro-associates.com

Design changes can be costly, particularly when the latter stages of technology maturity and product incorporation have occurred. Estimates have put the cost of design changes at 100X the value of non-recurring engineering expenditure during the preliminary and detailed design phases.



When evaluating a new technology introduction project or new product development program, it is important to consider the impact of potential design alternatives, in addition to technical performance parameters. While greater efficiency may be achieved, it may come at an unacceptable cost in the form of unanticipated royalty payments which destroy margins. The commercial implications of these intellectual property rights (IPR) infringement risks are typically not considered when the design process is undertaken.

These unintended consequences have already impacted the industry in the form of an accelerated pace of consolidation resulting from royalty payment induced negative margins. Wind turbine OEMs were forced to re-evaluate their presence in the US market several years ago due to a market downturn. While uncertainty regarding the renewal of the production tax credit (PTC) was the major driving force in predicting demand and making capital investments during that time, the next largest contributing factor to the decision by the Tier 2 OEMs to exit the US market was the royalty payment owed on turbine control technology.

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From 2007 - 2009 market pricing was up, and to the extent that turbine sales occurred, the royalty cost for the Tier 2 OEMs was able to be absorbed in the margin and passed on to the equipment purchaser. After 2010, margins for Tier 2 OEMs started to go negative because of declining demand and a fixed cost per unit royalty payment. When market pricing fell, this fixed cost could no longer be passed on to equipment purchasers and order volumes were not high enough to distribute the cost of the royalties across the order book. The result was a decision to pull out of the market rather than sell at a loss during a period of downturn.

Now as OEMs look at a global market which is poised to flourish this year and next, there is an opportunity to ensure the past does not repeat itself. Incorporation of an independent IPR assessment during the design phase will provide the following ancillary benefits:

- **IPR infringement risk identified and quantified prior to high-rate production** - this saves cost of design changes later since known risks are identified and avoided in the design process. Proactive companies avoid the 100X design cost of changing the product which has already been introduced.

- **Commercial risk of IP infringement mitigated** - Mitsubishi Heavy Industries (MHI) lost ~US$2B in revenue because they did not have an independent assessment of IPR infringement completed prior to the introduction of their 2.4MW product in the US market. Beyond this, MHI spent US$11.5M on litigation and royalty fees in addition to the threat of a patent infringement litigation damage award of US$169M which was ultimately avoided, but the public relations (PR) damage was done when they got tagged with an infringement litigation.

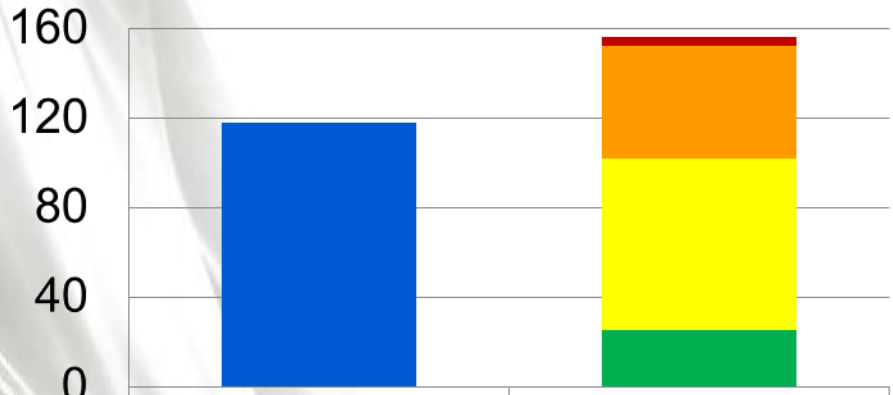
- **Design is most technically proficient which can be afforded** - the performance benefit of a new technology is considered along with the scope of patent filings related to that technology. The result is a cost / benefit assessment which indicates the degree to which competitor IP can be avoided while still delivering a technical solution which achieves programmatic requirements. Alternatively, commercial sourcing of specific technology or in-licensing can be determined as necessary.

How to Incorporate IPR Evaluation into the Design Engineering Process

The process of IPR infringement risk mitigation works by starting off with a comprehensive patent landscape and catalogue of IPR and technology in the industry. This is typically the top failing of IP search firms and law firms, because lack of industry domain expertise and lack of technical subject matter expertise usually leaves an incomplete set of results for the freedom to operate (FTO) review.

From a study which was conducted, conventional patent search tools and methods were compared to a wind patent landscape which had been rigorously reviewed. Results on one category of technology indicate that the conventional patent search methodology employed by IP search firms or law firms will result in an incomplete set of results, false positive results, and results which require significant further study and examination. This last step is what leads to

expensive costs of FTOs, and is typically one reason why most companies do not engage outside parties to help facilitate IPR infringement risk mitigation at all.



	Conventional	Totaro & Associates
No Classification	118	
High		4
Medium/High		50
Medium		77
Low		25

Keyword-based Prior Art Search	Search String	Totaro & Associates Patent Landscape
118 Results	"Wind Turbine" AND "Power Factor Control"	156 Results with Risk Classification (L, M, M/H, H)

Once again underscoring the importance of technical savvy, the patent claim breadth of each filing must be compared to the known use of that technology in the industry. The methodology used to assess the patent claim breadth is below:

Low
Patent / Application is not relevent to the pervasive set of technologies and products in the industry.

Medium
May have been relevant in the past or is simply not broadly applicable. Multiple methods of design around exist.

Medium/High
Important filings which the industry needs to be cognizant of, but these can likely be avoided / mitigated.

High
Critical filing which has been asserted, licensed or enforced, or is otherwise highly likely to be in the future due to claim breadth.

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The comparison results in the composite risk score of a particular product which can be compared to other products previously insured or industry average data. The composite risk score is then calculated based on the number of filings which can be classified in each risk category. These results are consolidated to provide an overall relative ranking and provide an understanding of the scope of mitigation work required, or the risk premium which can be assessed.

Patent #	Title	Component	Technology	Relevance to Utility-scale WTG Industry	Company 1 Risk to Product #1	Company 1 Risk to Product #2	Company 2 Risk to Product #1	Company 2 Risk to Product #2
USXXXXXXX	DC-DC CONVERTER CIRCUIT USING AN LLC CIRCUIT IN THE REGION OF VOLTAGE GAIN ABOVE UNITY	Electrical	Frequency / Voltage Regulation	M Common technology, but design around possible.	M Requires investigation, design alternatives exist.	M Requires investigation, design alternatives exist.	M Requires investigation, design alternatives exist.	M Requires investigation, design alternatives exist.
USXXXXXXX	TURBINE	Drivetrain	Reliability	L Older technology, limited industry applicability.	M Requires investigation, design alternatives exist.	L Technology not present.	L Technology not present.	L Technology not present.
USXXXXXXX	A PROTECTED WIND TURBINE BLADE, A METHOD OF MANUFACTURING IT AND A WIND TURBINE	Blade	Manufacturing	M Only relevant if VARTM process is used.	L Technology not present.	L Technology not present.	H Similar design architecture.	H Similar design architecture.
USXXXXXXX	A WIND TURBINE AND A DIRECT-DRIVE GENERATOR	Generator	Efficiency	H Widely used technology.	H Similar design architecture.	H Similar design architecture.	H Similar design architecture.	L Technology not present.

In a case study which is presented here, one particular turbine manufacturer was seeking product validation for entry into the US market. The composite risk score was quantified at 18 of 3,200 patents being high risk, indicating immediate mitigation action was required on those matters. Nevertheless, in this case, the turbine manufacturer was still well below the industry average in the highest risk categories of patents.

The detailed risk mitigation of the 18 identified patents found that 5 of the patents had extremely broad claim breadth and were not actually being utilized, while the other 13 patents were deemed invalid. This clean bill of health enabled the turbine manufacturer to obtain an intellectual property indemnity insurance policy and qualify for preferred project financing.

Risk Categories	Product		Industry Average		Composite Risk Score
	#	%	#	%	
High	18	0.6%	32	1.0%	Below Average
Medium/High	167	5.2%	224	7.0%	Below Average
Medium	1,881	58.8%	1,728	54.0%	Above Average
Low	1,134	35.4%	1,216	38.0%	Below Average
Total	3,200	100%	3,200	100%	

The protocol for risk mitigation utilizes independent legal counsel, validity evaluation, and patent license agreements, if necessary. Therefore, the existing legal infrastructure is not displaced, only more intelligently leveraged. Many times, the engagement of legal counsel is unnecessary which saves significant cost to the process for all parties involved.

This comes in the wake of a recent matter in which three of the United Kingdom's most prominent offshore wind projects, valued at almost US$5billion collectively are at risk from a patent infringement lawsuit between Enercon GmbH and Siemens (the equipment supplier), Dong (the owner / operator), and A2SEA (the equipment installer).

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The approach which Enercon has taken to target the turbine supplier, wind park owner/operator and turbine installer in the litigation indicates the extent to which IP risk has wide-reaching impacts on project development. When billions of pounds in offshore projects are on the line, this speaks to a need for routine mitigation of IP risks in the due diligence process that financiers and insurers undertake, similar to how technical risks are managed.

The real question is why are financiers allowing their billion-dollar projects to be put at risk by not authorizing the expenditure of 0.1% of the total commercialization cost for an independent assessment of IPR infringement?

The answers are out there if they would bother to look.

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