



by Laurence Claus

10 Things to Know About Automotive Fasteners

关于汽车扣件的十项必知要点

During my first twenty five years in the fastener industry I worked for a fastener manufacturer that focused primarily on automotive fasteners. Several years into my tenure I had the opportunity to work on a project outside of the automotive industry, with a large computer and peripherals manufacturer. After many months of project work it was obvious that the project was dead-on-arrival. This was an uncustomary loss and as I reflected on the reasons for this, the one that stood out above all the others was that we were simply not equipped to support the needs unique to this industry segment. We were very capable of providing the necessary application engineering and had the manufacturing capabilities, but we were too ingrained in our own paradigms and lacked important industry specific knowledge so that we failed to execute properly to meet the customer's needs.

I would later experience this a second time when we attempted to gain a place in the aerospace fastener industry. Once again, it was obvious to me that we were unsuccessful because of our lack of understanding and desire to learn about and meet the needs of this unique industry segment.

Similarly, companies that know little about the automotive industry but seek an entry may find it very difficult to gain a foothold. To succeed, a company must be prepared to educate themselves in the unique ways and requirements of the segment and then back-up what they learn with solid and unwavering execution. In fact, new entrants must be prepared to "run faster" and "perform better" than their more established counterparts. There is no "half-way" and companies that are not "all in" will quickly find their efforts have been wasted.

Following are ten things that one should understand about supplying fasteners in the automotive industry:

Standardized Products?

I recently assisted a university business student in some research work he was doing on the automotive fastener market. He asked me a



我进入扣件业的前25年是替一家专注于汽车扣件的制造商工作。在那期间我有机会接到一个汽车产业以外的案子，并得以接触很多电脑和相关部件制造商。进行几个月后，这个案子显然必须提前宣告失败。这是一次特殊的失败经验，当我试着去找出原因时，最先想到的是我们对这产业的特殊需求不甚了解。虽然我们有能力提供必要的工程应用也具备生产能力，但我们太执着于本身的领域且缺乏该产业重要的知识，因此最后无法合适地满足客户所需。

之后我们试着打进航太扣件产业时，又经历一次类似经验。很明显地，因为缺乏深入了解，我们又无法成功完成并达到该产业特殊的要求。

类似情况下，那些对汽车产业不甚了解却寻求进入该领域的厂商会发现很难占有一席之地。若要成功，厂商必须准备好熟悉特定产业的特殊作法和要求，并坚定不移地去实行。实际上，新进者必须准备好比其他提早进入的对手「跑得更快和表现得更好」。达到此目标没有捷径，而且厂商若没有积极投入就会发现先前的努力皆是枉然。

下列是针对想打入汽车产业扣件供应厂商的十大注意要点：

number of questions trying to understand what separates automotive fasteners from those consumed by other industries. I found myself telling him that one of the significant distinguishing features of the automotive fastener market is that almost all parts are customer proprietary. That does not necessarily mean that parts do not resemble consensus product standards or are considered standard within an Original Equipment Manufacturer (OEM), but this industry generally does not purchase products defined by consensus product standards such as ASME, DIN, JIS, or ISO. In fact, many of the OEMs have libraries or catalogs of standard parts which they maintain and encourage broad usage of, but these remain unique to that particular OEM or lower Tier supplier. This behavior is in stark contrast to industries such as aerospace or heavy truck where many of the fasteners are purchased to consensus product standards and are, therefore, as likely to be purchased by one user as another.

Part Complexity

Although this is likely an oversimplification, the automotive fastener industry can probably be characterized as consisting of two broad categories, simple parts and sophisticated (or engineered) parts.

“Simple” parts abound in the automobile and include items like screws for trim, basic mounting bolts and screws, weld studs and nuts, flange nuts, basic self-tapping screws, washers, and a wide variety of other basic fastening components. On the other hand, there is also a wide variety of more “sophisticated” product. These include items like parts for brake components, parts for steering columns, parts for safety systems (airbags and restraints), special self-tapping screws, internal engine parts (such as connecting rod bolts and engine head bolts), and other similar components. Many of these parts are cold headed, engineered components with multiple secondary operations. It is important to understand this distinction because manufacturers are often aligned around them. In other words, it is pretty common to have companies that are significant players in the production of the “simple” parts and have no presence in the more “sophisticated” product range. Likewise, many of the companies that make the “sophisticated” parts tend to align themselves as experts in only several segments. For example, a company may be a significant supplier of brake and steering parts but have absolutely no presence in engine components.

Automotive Customers

Customers for automotive tend to fall into one of three categories, OEM, Tier, and Aftermarket. Of the three the hardest and perhaps the most demanding are the OEMs, or the actual automobile manufacturers. For new suppliers they can be very difficult to



1. 标准化的产品？

我最近协助了一位正在做汽车扣件市场研究的大学商管学生。他问我许多问题，试着要找出汽车扣件与其他产业用的部件有何不同？我告诉他汽车扣件市场最明显且不同的特色之一，就是几乎所有部件都是客户的专利财产。这不一定谓该部件就不像普遍使用的产品标准或是被代工认为是标准品，而是这个产业基本上不会购买由普遍产品标准(ASME、DIN、JIS或ISO)所定义的产品。事实上，很多代工厂商都有标准品的参考库和目录，但对特殊的代工厂或较低阶的供应商来说这都是相当特殊的情况。这样的状况与其他像是航太或重卡等很多扣件都是符合一般产品标准的产业大不相同，他们不受限于单一使用者使用。

2. 部件复杂度

虽然这有点过度简化，但汽车扣件产业或许可略分为两大类，其一是简单部件，其二是精密加工过的部件。大量存在于汽车的简单部件包括装饰螺丝、基本安装螺栓螺丝、焊接螺柱和螺帽、法兰螺帽、基本自攻螺丝、垫片和各式基本紧固零部件。另一方面，也有许多更精密加工过的产品，这些包括煞车零件用部件、驾驶座用部件、安全系统(安全气囊等)用部件、特殊自攻螺丝、内引擎部件(连接柱螺栓和引擎有头螺栓)及其他类似部件。很多这些部件有经过冷锻头，是经多次二次加工处理后的精密部件。了解其差异相当重要，因为制造商需要从中加以区分。换句话说，基本部件的重要制造商常被定位为精密加工产品以外的生产厂商。同样的，许多生产精密加工过部件的厂商倾向把自己定位为少数特

break into because they work very hard to keep their supply base to a reasonably select group of companies with enough critical mass to warrant the investment in making and maintaining a business relationship. The Tier companies are generally much easier to work with. They often have less in-house knowledge of fasteners and, therefore, value companies that can support them with good engineering, quality, and commercial resources or services. Although they may be easier to form a business relationship with, one should never assume that the product is less sophisticated than OEM product. In fact, the opposite is probably true, as it is the Tier companies that are providing the sophisticated automotive systems like foundation and ABS brakes, steering, and safety to name just a few. Understanding how fasteners and cold headed components are integrated into these systems is important. The last category is aftermarket. In this case the customer's engineering resources get even "thinner" and they have a greater dependency than ever on their supply base. Unfortunately, many of these aftermarket products are reverse engineered so that many of the important but subtle design details included in the OEM part may be missed and, therefore, not included in the aftermarket parts.

Purchasing and Engineering

The larger the organization the more likely their approach to fasteners is highly developed. In the large OEMs there are purchasing resources dedicated exclusively to buying fasteners and engineering resources exclusively working on fastener engineering. As such, although these individuals may not be generalist experts on fasteners, they tend to be reasonably, if not very, knowledgeable of their specific use of fasteners. As customer companies get smaller in size, especially at lower level tiers, fastener purchasing tends to be shared with other commodities, and no real engineering experts exist on staff.

Turnover

In many cases the fastener commodity is not considered as glamorous as others. Therefore, it often is a stepping stone department for many in purchasing, and, to a slightly lesser degree, in engineering. This means that building relationships can be challenging because the primary contact in the relationship is periodically changing. This has the unfortunate consequence of putting the supplier in a reactive mode and repeating valuable time and energy invested to keep the relationship vibrant.

Communication and Incentives

Automotive OEMs and many Tier suppliers are large and have a widely dispersed manufacturing footprint. This creates significant challenges because purchasing may be located in one location, engineering in another, and manufacturing in still another. The result of this structure is

定领域的专家。举例来说，某家公司可能是煞车和驾驶部件的知名供应商，但它不生产引擎零部件。

3. 汽车产业客户

汽车产业客户可区分为三大类：代工厂(OEM)、层级(TIER)厂商和汽车修配(AFTERMARKET)商。三类中最困难打入，也可能是需求最大的是「代工厂」或者「实际的汽车制造商」。对新的供应商来说要打入相当难，因为他们必须非常努力来留住其供应基础的厂商以确保业务关系能维持下去。层级厂商基本上合作相对容易多了。他们多数没有充足的扣件厂内知识，因此他们很器重可以以良好工程能力、品质和商业资源服务支持他们的厂商。虽然与他们建立不错的商业关系比较容易，也不能说他们的产品跟代工产品比起来较不精密。事实上，应该反过来说，因为层级厂商可以提供像是自动煞车、驾驶和安全等精密汽车系统。了解扣件和冷锻头部件如何整合进这些系统很重要。最后一个大类是汽车修配，在这一类中，客户的工程资源变得更少，依赖度比他们的供应基础来得高。不巧的是，许多汽车修护产品是反向加工的，因此许多代工部件重要但细微的设计细节可能被遗漏而未被纳入汽车修配部件中。

4. 采购和加工工程

组织越大，其扣件获取管道发展就越发达。大型代工厂中有很多特别针对扣件的采购资源以及针对扣件加工设计的工程资源。因此，虽然这些厂商可能不是扣件专家，合理来说他们也都或多或少对扣件的用途略知一二。如果厂商客户规模较小，甚至是处于供应链中较低阶层，扣件的采购可能就会参杂其它产品，员工中也就没有真正的工程专家。

5. 负责人员的流动率

扣件产品在很多时候都被认为不比其他产品亮眼。因此，它经常成为许多采购人员和工程人员(这比例较小)的跳板。这表示要建立关系就会很有挑战性，因为主要关系联系人时常在更换。这会导致供应商必须一再重复花费宝贵时间和投资精力来维系关系热度，且结果也不一定保证满意。

that the customer usually is challenged by poor internal communication. In other words, the purchasing agent does not know and is not in close communication with the engineer, and rarely knows what is going on at the plant level. This structure also tends to create “silos” with respect to incentives. Because they are not communicating well with one another they each tend to “march to the beat of their own drum” and behave in ways that reflect how each is incentivized. For example, because the purchasing department may be measured on how much cost they can reduce, they work very hard to find the lowest cost product. In doing so, they may fail to consult with the using plant or take into consideration how those decisions might lower quality standards that have a negative effect on the plant assembly operations.

Pre-Production Part Approval Process (PPAP)

Many industries have requirements to validate parts prior to going into production. No industry segment, however, even comes close to doing this at the level of the automotive industry. This process is known as PPAP or Pre-Production Part Approval Process. Where many industries require one or two documents be submitted, the PPAP submittal for even the simplest fastener is likely to be fifty to seventy-five pages in length. The PPAP includes a validation of dimensional and performance testing results, Pre-Production and Production Process Control Plans, Process Flow Diagrams, Process Failure Modes and Effects Analysis, Capability Studies, Gage Repeatability and Reproducibility Studies, and any other items requested by the customer. Many a new supplier to automotive has been tripped up by the PPAP requirements and the failure to recognize how significant an investment in resources this requirement demands.



TS16949 and Other QMS Systems

TS16949 is an automotive specific Quality Management System (QMS). It is basically a Quality Management System structured on the ISO9001 format with added requirements important and specific to the sponsoring automotive OEMs and certain Tier companies. To obtain TS16949 registration, companies must undergo a rigorous third party audit which is reassessed each year near the anniversary of the previous year's audit. Having such a system is often a prerequisite of

6. 沟通和动机

汽车代工商和许多层级供应商的规模通常很大且有占地广大的制造据点。这会产生明显的挑战，因为采购可能在某处，工程设计在另一处，制造又在另一处。此结构下产生的结果就是客户必须面对内部不良沟通所产生的挑战。换句话说，采购代理不知道且与工程师沟通不良，甚至几乎不知道工厂端在发生的事。这样的结构容易引发相关动机。因为彼此沟通不良，容易各打各的鼓并根据各别动机而表现出来。例如，因为采购部门可能会考虑他们能减少多少成本，因此很努力来找出最低成本的产品。这样一来，可能会错失与使用工厂谘询的机会，或没考虑到这些决定可能会降低多少品质标准而对厂房的组装运作造成负面影响的结果。

7. 生产件批准程序PPAP

很多产业都会要求部件进入正式生产前要经过批准确认，但没有产业做到汽车产业这样的水准。也就是所谓的生产件批准程序。许多产业会要求缴交1至2份相关文件。一份设计最简单的扣件可能也需要50-75页长度的报告书。生产件核准程序包括尺寸性能测试结果批准、生产制造前流程控制规划、加工流程示意图、加工失败模组及影响分析、能力研究、量规重复性和再制性研究、及其他客户要求的项目。很多甫进入汽车产业的新供应商往往卡在生产件批准程序PPAP或无法认知到这个要求所需的资源投资有多么重要。

8. TS16949认证和其它品质管理系统

TS16949认证是专属于汽车类的品质管理系统(QMS)。基本上是以ISO9001为基础再另外加上针对赞助汽车代工商和特定层级厂商所设定的关键要求。要取得TS16949认证登录，厂商必须进行相当严格的第三方稽核，且在上一年的稽核快要满一年时要重新进行一

the OEM or Tier customer. In other words, they will not even allow a company to quote without having this or an equivalent registration.

Additionally, there may be other QMS formats required. These requirements will be defined by the customer. Today it is very common for some OEMs and Tiers to also require ISO14001 registration (environmental and safety awareness) or ISO17025 (lab accreditation.)

Quality Requirements

In addition to any contractual or sales terms that a supplier may agree to with an automotive customer, many also have supplementary Supplier Quality Requirements. It is very important that new suppliers understand these requirements before agreeing to take a job as they are rarely communicated up-front and can be quite onerous. In addition to specifying how the customer will grade your performance, they often throw in “zingers” related to things like cost responsibility for quality spills, recalls, and warranty.

Continuous Improvement

Automotive customers expect continuous improvement from their suppliers. Unfortunately, and in my opinion, very regrettably, this almost always only takes the form of price reduction. It is far too rare that a customer will actively engage their supplier to make real engineering and quality improvements. Once again, new suppliers are often caught off guard when they are demanded to provide cost reductions shortly after going into production on parts. In particular, this tends to be one of the biggest conflicts between automotive OEMs and their suppliers. In fact, I have encountered many organizations over the years that refuse to do business with automotive for this reason alone. It is truly unfortunate, as there are many ways beyond just the price of the product that continuous improvement activities can reduce the total cost of the system.

Conclusion

This is certainly not an all-inclusive list of things that make automotive unique from other market segments. In fact, there are many other details and nuances to these ten items that set the automotive fastener market apart from others. In essence, it boils down to the point that parties interested in joining this market segment must be prepared to invest in educating themselves about the necessary requirements and putting in-place the required resources to fulfill them. For new entrants and even for seasoned veterans, this can, at times, be daunting. However, in the end, the automotive fastener market segment can be an exciting and enriching place to be and the automotive industry needs to continually add to and improve from within its supplier ranks. ■

次。取得此系统认证通常是代工厂商或层级客户所要求的第一前提。换句话说，他们甚至不会对没有该认证或类似认证的厂商进行报价。

此外，可能还会要求其它品质管理系统的认证。这些要求是由客户方所定义。现今很常见一些代工厂商和层级厂商同时拥有ISO14001(国际环境管理系统认证)或ISO17025(实验室认证)。

9. 品质要求

供应商除了在契约和销售条件上会跟汽车类客户谈到以外，很多也会有补充性的供应商品质要求。很重要的一点是，新供应商在接受任务前要充分了解这些要求，因为他们几乎不会被事先沟通知，所以可能会相当麻烦。除了标出客户可能会如何评比你的表现，他们常常还会丢出一些品质骤降、召回和保固等关于成本责任的问题。

10. 持续性改善

汽车客户希望能从其供应商中获得持续性的改善。不幸的是，我认为这最后往往沦落至削价的型式。很少会听到有客户会主动加入供应商来达到实质的工程设计和品质改善。常常当新供应商在接单生产后被要求降低成本时都会在品质上有所松懈，这尤其容易导致汽车代工商和其供应商之间的冲突。事实上，过去几年来我遇过许多组织基于这个理由而拒绝跟汽车产业合作。这真的很可惜，因为在产品价格之外还有许多方式可以持续改善和降低系统的总成本。

总结

上述几点当然不是让汽车产业跟其他产业比起来如此独特的所有原因。事实上，还有许多其他细节和些许差异让汽车产业跟其他产业比起来如此不同。重要的是，它总结出一个重点，就是想加入汽车市场的厂商必须让自己知道这产业所需的要求并取得相关资源来实现最终目标。对新进厂商甚或产业老手来说，有些时候可能会使人感到气馁。不过，直到最后，汽车扣件市场仍会是让人感到兴奋和充实的地方，且汽车产业需要持续去增加和从供应商层面进行改善。 ■