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## DJH Engineering Core Value

The most important metric for DJHEC is our Customers' success. That can materialize as increased market share of a refreshed product, reduced cost or warranty on an existing product, or expansion of product line. As we build our team and capabilities, we evaluate every decision through this lens giving careful consideration to how each new capability or strategic decision can help our current and future Customers achieve success. For smaller companies, the greatest need can be product specification, product development, prototype procurement, and assistance with early production runs. For larger companies this can include helping engineering managers balance staffing needs, achieve their individual and division goals, and ultimately be promoted within their organizations. This guide contains good information for you to consider as you explore the benefits of partnering with an Engineering Firm.

## Advantages of Partnering with an Engineering Firm

The most common reasons to partner with Engineering Firm are:

1. **Technical Capabilities.** Engineering Firm who has been in business for 30+ years will have accumulated wide range of experience and capabilities across different industries. This experience and technical expertise benefits client companies by accelerating development and helping to overcome technical challenges.
2. **Flexibility.** Relationship with capable Engineering Firm provides flexibility to increase or decrease engineering team as need fluctuates through product development and market cycles.
3. **Job Security.** Thoughtful partnership, properly executed, with Engineering Firm provides management team with lever to pull when budgets need to be adjusted. This translates to increased job security for direct employed team. We will explore how to execute this effectively.
4. **Employee Development.** Companies with smaller engineering teams benefit from partnership with an Engineering Firm as a resource to help execute project load and to provide outside technical resource to strengthen team. Larger companies can provide mid-level engineers with opportunity to leverage their growing expertise by providing the mid-level engineer with resources from Engineering Firm to help them execute a project showcasing their abilities. This amplifies the value of the mid-level engineer to the organization and can provide springboard to identify talented mid-level engineers for promotion.
5. **Reduce Cost.** Client companies save money by reducing software, hardware, and overhead costs. For software, the benefit is usually tied to specialized analytical software packages that are not justified for purchase or lease or training of internal resources. For engineering labor costs, potential for cost reduction is normally only feasible if the Engineering Firm has an office in a low-cost region.
6. **Cross-Pollination Across Industries.** The best Engineering Firms have experience from wide range of industries to bring to your attention for consideration. At DJHEC, we see this benefit to our clients on nearly every project.

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## Engineering Firm vs Engineering Staffing Firm vs Recruiting Firm

Depending on your needs an Engineering Firm, Engineering Staffing Firm, or Recruiting Firm may more closely align with your organization’s needs. The following table highlights some key differences between these types of Firms:

| Engineering Firm  | Engineering Staffing Firm  | Recruiting Firm  |
|---|--|--|
| <ul style="list-style-type: none"> <li>• Firm has accumulated technical capability and experience.</li> <li>• Projects structure can be fixed cost bid or time plus material.</li> <li>• Face-to-face kickoffs, design reviews, workshops as needed.</li> <li>• Engineers located off-site.</li> <li>• Engineers with specialized skills rotate in and out as needed.</li> <li>• Engineering Firms typically provide much higher value, however the cost is also typically higher.</li> <li>• Higher cost can be mitigated if Engineering Firm is structured to leverage off-shore location.</li> </ul> | <ul style="list-style-type: none"> <li>• Place candidates on-site for agreed upon period of time (typically 6-12 months).</li> <li>• Function as direct employer of engineer (provide HR, management, benefits to engineer).</li> <li>• Engineer works on-site.</li> <li>• Your company provides work space, computer, software, etc.</li> <li>• Services are equivalent to time plus material.</li> <li>• Staffing service paid cost of engineer plus profit margin (typically 15%).</li> <li>• Good option for companies to have trial period before offering direct employment</li> </ul> | <ul style="list-style-type: none"> <li>• Main function is to find and screen candidates to help fill permanent, direct employee positions.</li> <li>• The best of these firms focus efforts to develop better access to engineers who are currently employed (assumed to be better candidates) than Engineering Staffing Services.</li> <li>• Contingent paid upon filling position (typically 20% of salary).</li> <li>• Retained service (typically for more specialized position) paid in stages (ie search initiation, candidate presentation, filling position). Typically 25% of salary.</li> <li>• Do not hire engineers directly.</li> </ul> |

Table 1: Comparison between Engineering Firm, Engineering Staffing Firm, and Recruiting Firm.

If your objective is to grow your internal engineering team through directly hiring, the best choice will be to utilize an Engineering Staffing Firm, Recruiting Firm, or to hire through your normal channels. DJHEC does not provide either of these services, however we have very good relationships with several reputable firms who we are happy to recommend should this fit your needs.

As an alternative to growing your internal engineering team, a long-term partnership with an Engineering Firm provides many benefits including: increased flexibility; access to Engineering Firm’s internal expertise; access to specialized analytical software and experienced engineers which would be prohibitively expensive otherwise; learnings from wide range of industries and projects; increased job security for your team; opportunities for growth for your team; and reduced cost if executed properly.

The last point, Cost, has been tied to the caveat of “if executed properly”.

There following are two key elements to “execute properly” which we will review in detail in the following sections:

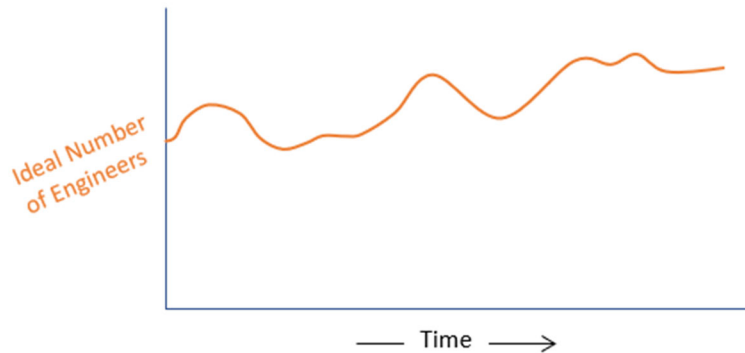
1. Properly size internal engineering team for partnership with external Engineering Firm.
2. Partner with Engineering Firm who has on-shore / off-shore hybrid model with cost savings benefit directed to their customers.

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## How to Organize Internal Team for Partnership with Engineering Firm

The companies and divisions within companies with whom we have had the most success have been deliberate and thoughtful with their approach to partnering with an Engineering Firm. This section contains our advice drawing on decades of experience working with many companies who have successfully partnered with an Engineering Firm as well as learning from our mistakes with those who have had less success.

The first step is to clearly define the strategy for the engineering work force. Most of the time the fluctuation and evolution of design cycle results in periods of high and low engineering resource needs within an organization. As a starting point, it is helpful to review past engineering needs and attempt to forecast future trends. The sketch below shows typical engineering needs over time for a healthy company with growing revenue. Periods of increased engineering needs result from product refresh cycles, product expansion, cost reduction or warranty reduction efforts, etc. Manpower requirements typically trend upwards as shown in the image below where the orange line represents ideal engineering team size.



At what level should the company staff their internal engineering team? Engineering Departments, focused on delivery and quality, tend to want to staff toward the top of this range. Management, focused on efficiency and operating costs want to operate with smaller staff. Most companies end up compromising and staffing somewhere in the middle then handling extreme peaks with hiring of new staff or short-term contract. See below:



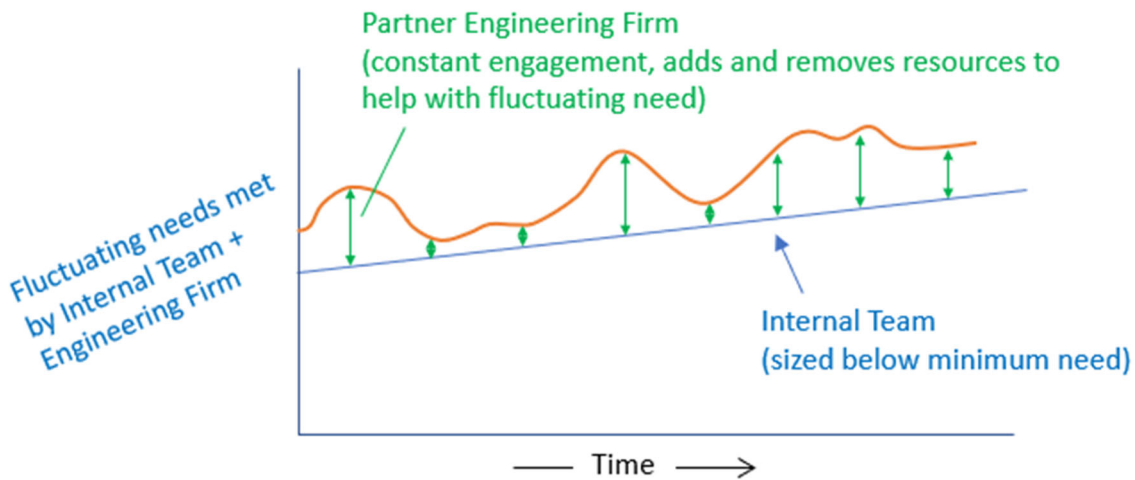
Although common, this approach has several drawbacks:

1. During extended periods of high demand the engineering teams typically work long hours and can experience burn-out, fatigue, and increased risk of costly errors. Reduction of cost associated with Engineering Team can end up being very expensive.

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2. During times of high demand companies who try to add contract resources struggle to bring those resources on board efficiently. Many times the internal Engineering Team, who are already overwhelmed, can become frustrated with this additional onboarding load which falls to them. Worse, once onboarding is complete and the contract resource is efficient, the need is often short-lived or past. This non-value added process is often repeated as there is strong probability the same contract engineer will not be available during the next peak.
3. During times of slow demand the company does not have a large buffer. If there is an extended slowdown the company will need to make tough choices such as reducing team size, freezing pay, or cutting benefits, etc.

So at what level should the company staff the internal team? Consider the option below:



In the example sketched above the company has a strategic partnership with an Engineering Firm. The company has deliberately sized its internal engineering team below the minimum projected need. The Engineering Firm has constant engagement with the team. This has several advantages:

1. The company benefits from long-term relationship with Engineering Firm. The Engineering Firm can assign a leader to your company who will know your people, products, and processes. During extended periods of high demand, the Engineering Firm will help absorb the increase without burdening the internal team with additional onboarding load.
2. During slow periods, the company has ability to react and reduce spend very quickly. Strategic partnership with Engineering Firm will allow company to reduce or increase team at short notice. An Engineering Firm with work force located at its own facility has remarkable capability to react to changing needs of its customers. As need decreases, engineers can be shifted to other projects. As needs increase, engineers who have experience working on your products can be shifted back to team. This is not practical or possible with Engineering Staffing Firm who places resource on-site on temporary contract basis.
3. The company now has a substantial cushion before any cuts to directly employed engineers need to be considered. This results in more stability and job security for the directly-employed staff.

The partnership proposed above enables increased efficiency of your company’s internal resources and provides all the benefits associated with a partnership with an Engineering Firm, however it will be prohibitively expensive unless the Engineering Firm is structured for low cost. One way this can be accomplished is with a hybrid on-shore / off-shore structure.

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## Hybrid On-Shore / Off-Shore Engineering Firm

In order to provide the benefits of a strategic partnership with an Engineering Firm to our customers at a cost aligned with or lower than direct hiring of internal team, DJHEC has created a hybrid on-shore / off-shore business model with our off-shore location in Martin, Slovakia.

Martin, Slovakia has several key advantages which set it apart as a perfect location for an off-shore Engineering Office. First, the region has a long history of industrial manufacturing. Second, the region is home to several Universities highly regarded for their technical engineering curriculum. Third, as a full EU member, IP laws are enforceable and the region is known for high standards of ethics. Finally, the regional cost of living is lower. The city and region are great balance to permit lower cost without sacrificing quality of output.

DJHEC has established a world-class engineering team in Martin, Slovakia who work with our US-based team in Salt Lake City, UT. This is not wholly unique. Many Engineering Firms have off-shore locations. The difference is that most of these firms have set these locations up to increase their profits rather than benefit their customers.

As mentioned in the first paragraph of this Newsletter, our most important metric is our Customers' Success. We utilize the office in Martin, Slovakia to help our customers benefit from working with an Engineering Firm with cost aligned with or lower than what the customer would incur with directly employed team. We believe this focus on our Customers' Success ultimately leads to long-term success of DJHEC, even if our profit margin is lower than other Engineering Firms. We have found that if we can work with a team of 1 SLC engineer to 5-7 Slovakia engineers, our combined rate is very competitive with no loss of productivity or quality.

Why the US-based engineer? Wouldn't cost be lower to work directly with the off-shore Office? It is not easy to efficiently work with an off-shore Engineering Office. Many have tried and failed. Common pitfalls are lack of proper communication, over-promising or over-simplifying from representatives, lack of industrial experience in off-shore location, and frustration from high turnover in off-shore location. We have found a balance with main point of contact an Engineer based in SLC Office for US-based customers with support staff located in Martin Office. For customers located in Europe, main point of contact is located in Martin Office.

In addition to lower cost, we have realized over the years some additional benefits to this hybrid on-shore / off-shore business structure which compliment and even eclipse the benefit of reduced cost:

1. Accelerated development through overnight response. The dual location across off-set time zones allows very quick turnaround. Imagine being able to make a call late in the afternoon requesting design update, analytical iteration, or concept generation then finding the completed work ready for your review in your inbox the next morning. Our customers quickly evolve to take advantage of this ability.
2. Workshops. Our customers can take advantage of DJHEC facility to host off-site workshops for concept brainstorming, module development, and even product architecture planning. DJHEC is very good at facilitating these sessions. Key to many of these sessions is ability for team to have intense overnight work completed by off-shore office for review early the next morning to visualize progress and continue working. While it can be extremely beneficial for your team to meet off-site, we have had similar success with our customers hosting these sessions on-site at their facilities and our team traveling. Key to success is making sure the team is able to step away from normal daily activities to focus exclusively on the goals of the workshop. A 3-5 day workshop with intense focus can shave months off product development cycle.
3. Jump start new product or product line expansion. We have found success with hybrid on-shore / off-shore structure to help our customers with first iteration of new product or new model of existing product line. This is espe-

cially true if internal engineering team is focused on current product line. The experience of the internal team can be effectively leveraged to provide direction and feedback with Engineering Firm helping to execute new product. We have successfully worked through mule, prototype, and into production on many products with existing customers. Result for company is years shaved off time to market without expansion of full time, permanent engineering team. Key to success is communication and input from internal Engineering Team so they own design.

The final section of this newsletter offers some tips to successfully engage with an Engineering Firm to realize the added value to your company.

## Checklist to Start and Execute Project

One of the best ways to initiate a relationship with an Engineering Firm is to set up a pilot project. Here is what DJHEC recommends:

1. Screen Engineering Firm. You will benefit most from a firm who has experience in industry similar to yours. For example if you are an OEM of mobile equipment you will have best results from an Engineering Firm who has experience in this industry rather than medical devices or consumer products. This is not to say you will not have good experience with a Firm who lacks direct experience, but you would expect to provide more initial oversight. It is recommended to meet with the firm to share your objectives and review the Engineering Firm's capabilities and experience.
2. Define Scope of Project or Statement of Work for a Pilot Project. This document or slide deck should contain the information needed by the Engineering Firm to quote a project for your team. This document does not need to stand alone. In other words, it is expected that we will need to have a follow up call or meeting to ask questions about the project before an accurate quote can be created. If you don't have time to write this, please contact DJHEC. We can provide input or even write a draft of this document for you after a quick phone call.
3. Procure Quote. For pilot projects it is not always necessary to get competitive quotes. Your main objective is to give the firm a chance to prove their value. If the firm understands this they will be working hard to demonstrate they are a cost competitive partner. It is good idea to emphasize to the firm you do not want them to lose money on this project. You need to see the true value and cost that can be expected over longer period.
4. Issue PO and start project. For first projects with companies we recommend to meet face-to-face in order to help jump start relationship. We like to understand culture of company, products, manufacturing capabilities, product markets, etc. in order to add as much value as possible. At the time of this writing COVID 19 has resulted in travel restrictions and social distancing. At present time we are working remotely in all cases and can achieve same outcome with virtual meetings.
5. Schedule recurring Design Reviews. Avoid temptation to think of the working relationship with an Engineering Firm as scope thrown "over the fence" and deliverables thrown back. To have best results, the team should schedule recurring design reviews at least twice per week. The agenda should include schedule update, progress update where design or analytical results are shared, feedback from team members, new instructions, updated requirements, etc. Many meeting formats work well for these design reviews. A format which allows participants to sketch on screens is helpful to facilitate good engineering discussions and communication. Video conferences can also be helpful to see non-verbal cues during discussion to help enhance communication.

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- 6. Upon completion of Pilot Project, take time to review lessons learned. A good Engineering Firm will always initiate this meeting to follow up with you to make sure expectations have been met or exceeded and strive to improve continuously. This follow-up is best practice for firms who are ISO9001 certified like DJHEC.
- 7. From start, be deliberate about long-term vision for partnership. At DJHEC, we will work with your team to help strike balance which best meets your needs. Our primary objective is your success.

Following the above guidelines is a good start to ensure successful project outcome and start of Partnership.

## About DJHEC

DJHEC is an Engineering Firm specializing in new product development of mobile equipment. Our experience lies primarily in Construction, Agricultural, Off-Road Heavy Equipment, Oil / Gas Industry, Aerospace, and Automotive Industries. Our firm was founded in 1987 with offices located today in Salt Lake City, UT and Martin, Slovakia.



Salt Lake City Office



Martin, Slovakia Office

Contact Information:

### Patrick Hvolka

President

Email: [phvolka@djhec.com](mailto:phvolka@djhec.com)

Phone: +1 (801) 583-3934 x222

### David Rix

Director of Engineering

Email: [drix@djhec.com](mailto:drix@djhec.com)

Phone: +1 (385) 237-3051

### Jan Feja

Director of Engineering

Email: [j.feja@djhec.sk](mailto:j.feja@djhec.sk)

Phone: +421 43 430 2773

### Shane Anderson

Chief Engineer, Design

Email: [sanderson@djhec.com](mailto:sanderson@djhec.com)

Phone: +1 (385) 237-3052

### Andy Gill

Chief Engineer, Analysis

Email: [agill@djhec.com](mailto:agill@djhec.com)

Phone: +1 (385) 237-3053

### Jaro Brem

Deputy Director

Email: [j.brem@djhec.sk](mailto:j.brem@djhec.sk)

Phone: +421 43 430 2772

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