



## DESIGN CASE STUDIES

<b>HONDA</b>	<b>Honda Power Products</b> Honda Siel Power Products Limited Re-design of Handy Genset
	
<b>OVERVIEW</b>	
<i>Introduction</i>	Honda Siel Power Products Limited (HSPP) manufactures generators, water pumps, lawn mowers, brush cutters and general purpose engines for domestic, agricultural and commercial applications. Incubis was commissioned to design a handy genset that cuts manufacturing cost approximately by half compared to one of their popular models, viz. the EM650. The engine block was kept the same, the rest redesigned to reduce manufacturing costs, simplify assembly, increase reliability and reduce running costs – resulting in a popular new product, the EK400.
<i>Key elements of Design Strategy for Honda Power Products</i>	Since the engine block was a given, all elements were designed around its features and mounting points. Different features, but similar in function, were co-located. The external cover was replaced with a more ‘open’ configuration – with individual elements formally integrated. This also helped reduce heat gain in tropical conditions. Running costs were reduced by changing the fuel to kerosene.
<i>Innovation</i>	A completely new product was evolved around an existing engine block to meet the needs of emerging markets.

<p><i>Meet the team</i></p>	<p>The R&amp;D team of Honda Power Products did a due diligence of past projects and capabilities at Incubis, before proceeding with the project. Incubis, is one of India’s leading multi-disciplinary architecture and design firms with several Fortune 500 multinationals, small and medium enterprises as well as start-ups as clients. Some of the well-known Incubis’ clients include, Whirlpool, WPP, Wal Mart-Bharti Retail, Unilever, Tata Group, Singer, Samsung, Nokia, Hero Honda, Hilton Hotels, GE, Essar, Emaar MGF, Bridgestone Tyres and Barista.</p> <p>Incubis clients value the unique ‘Experience Design’ process which brings together customer insight, local knowledge and innovative zeal to create a wide range of built-forms, spaces, products and service offerings.</p> <p>Incubis was founded in 1995 by graduates of NID, IIT and TVB and has grown to a strength of over 55 Architects, Designers and Engineers based out of studios in New Delhi and Bangalore.</p>
<p><i>Company's history</i></p>	<p>Honda Siel Power Products Limited (HSPP) is a joint venture between Honda Motor Company, Japan and Siel Ltd., with 67% equity stake of Honda Motor Co., Japan. It is engaged in the manufacturing of portable generators, water pumping sets and general purpose engines at its state-of-the-art manufacturing facilities at Greater Noida, Rudrapur and Pondicherry.</p>
<p>EVOLUTION OF DESIGN AT HSPP</p>	
<p><i>Design process evolution</i></p>	<p>India has chronic power shortage which exacerbates during hot and/or humid spells. Supply is curtailed, sometimes for better part of the day, and inverters have limited capacity. People invest in gensets to tide over the crisis. Honda already had an extensive range, however, market intelligence felt that a cheaper product with lower running costs would be a good alternative to offer. The product would have to run long hours at peak capacity. Faster heat dissipation would be an advantage.</p>
<p><i>Organizational position &amp; influence of design in Honda</i></p>	<p>HSPP has a strong lineage regarding design – with inputs from Honda, Japan. Design is seen as a natural process to address consumer needs. The management is also aware that every region has its own individual needs, which has to be understood and addressed. Thus, Design and Development are high up on management priority since it is seen as key to commercial success.</p>
<p><i>Design capability building</i></p>	<p>Honda follows a robust and clearly charted development process. All drawings and documents have a structured format. It was extremely critical to understand and follow the same.</p> <p>It was important for the design team at Incubis to understand the basic functions and logic of component placement since this was the first generating set designed by the Studio.</p> <p>A platform was required for seamless exchange of modelling data with Honda R&amp;D in Japan. ProEngineer was chosen for the same. Incubis did a quick survey of operating conditions and interacted with existing customers, to understand operational and maintenance problems. These activities preceded the ideation stage.</p>

<p><i>Market</i></p>	<p>The market for generating sets is growing at a rapid pace due to increasing urbanisation and a growing gap between power generation and demand. Increase in per capita income is raising the standard of living, and a steady source of power is considered indispensable.</p> <p>Wherever power back-up is unavailable, say in a small commercial establishment or a residential situation, a handy generating set is being looked at as an essential.</p> <p>New opportunities are constantly evolving in emerging markets and HSPP is uniquely positioned to develop on them, being the market leader in terms of handy generating sets.</p>
<p><i>Status</i></p>	<p>The EK400 is manufactured in India and was initially exported to overseas markets. It is currently on offer in India.</p>

THE DESIGN PROCESS	
	<p>The design process followed at Incubis for the creation of a new handy Genset:</p> <ul style="list-style-type: none"> <li>&gt;Understanding the format for drawings and documentation followed at Honda. Study and understand the basic layout and components of a portable genset. Study the engine block, its ProEngineer model and drawings.</li> <li>&gt;A dipstick analysis of operating conditions and interaction with existing customers, to understand operational and maintenance problems.</li> <li>&gt;Generating concepts through drawings and sketches, in actual scale.</li> <li>&gt;Design approval in coordination with Indian and Japanese teams</li> <li>&gt;Detailed 2D drawings in CAD, followed by detailed 3D modelling in ProEngineer. Creation of detailed models mounted on the existing engine block.</li> <li>&gt;Final Design approval</li> <li>&gt;Detailed-drawings following Honda’s standard format and symbols.</li> </ul> <p>Thereafter, HSPP’s R&amp;D created several pre-production prototypes and extensively tested them to meet Honda’s performance standards. Technical shortfalls were resolved in-house.</p>
HONDA GENSET EK400 CASE STUDY	
<i>The business requirement</i>	<p>With the energy demand-supply gap increasing, demand for gensets would rise. A new, compact model; with low maintenance and lower cost of ownership, would significantly increase volume of sales. The EM650, with a rated output of 450 VA, was considered as a benchmark. It has good demand and sales volumes. Keeping a similar customer profile, it was felt that a cheaper product with lower running costs would be a good alternative to offer. Thus the fuel was changed to kerosene. The EM650 has pressure die-cast chassis and deep drawn covers, which completely encase the engine and alternator. It was decided to ‘expose’ individual components to bring down cost, enable faster heat dissipation, with a cheaper chassis.</p>

<p><i>Discover</i></p>	<p>The HSPP R&amp;D team also uncovered a fact that in general, Indian consumers tend to run their generating sets at the maximum rating for the longest durations, leading to avoidable failures like over-heating and over-load tripping. It proved difficult to sensitize consumers regarding these factors; they expected the product to perform in all conditions. Thus it was decided to reduce the continuous rated output to 350 VA, and keep the peak output at 450 VA.</p>
<p><i>Define</i></p>	<p>&gt;Since the engine block was a given, all elements were designed around its features and mounting points. The alternator, starting coil and power outlets were combined into a compact unit that was fastened to the engine block. The alternator housing was designed to be pressure die-cast.</p> <p>&gt;The fuel tank is mounted above the engine block. It was designed to have a 250ml petrol tank, for starting the engine, within the 2.7 litre tank.</p> <p>&gt;An exposed portion of the engine block has a deep drawn heat shield. The exhaust manifold similarly has another heat shield.</p> <p>&gt;The Chassis and carry handle were integrated using a formed tube. The shape of the tube was designed to protect the product from side impacts, especially when it is being carried by hand. The position of the carry handle was adjusted for centre-of-gravity.</p>
<p><i>Deliver</i></p> 	<p>The final design was developed for implementation through ProEngineer models, followed by detailed technical drawings that were made to standards followed by Honda worldwide, and models. Colour scheme, product graphics, and packaging were also developed for implementation.</p> <p>Prototypes were put through extensive trials by HSPP R&amp;D and some engineering changes introduced to increase reliability and reduce heat build-up in the machine.</p>
<p>EVALUATION</p>	<p>An evolving market gives rise to numerous emerging customer needs. Being sensitive to those needs and pro-active in providing viable solutions leads to profitable ventures. The EK400 is a response to prevailing Indian market demands, which also found ready markets overseas.</p>
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