



A brief introduction and description of **DESA** company

Introduction

- *Founded in 1991 as one of the top 10 national projects*
- *constructed on a 80-hectares land in Amol*
- *Entered the market with VASA22 engines from Wartsilla in 1998*
- *Assembled and tested 70 MAN 16RK215 engines for IR- Railway (started in 2004)*
- *Started a project with IR Railway to conduct main overhauls and repairing 50 MAN 16RK215 engines (30 engines were repaired, tested and delivered)*
- *Assembled and tested 104 Deutz engines for DG power plants of Telecommunication Company of Iran*
- *Installed DG power plants from 700 KW to 10 MW in Iran*
- *Conducted Navigation, Services and After sales services of MAN D2842 railbus engines*
- *Started D87 project in 2004 (A project for design and development of an engine family from 500 to 2000 kW power)*
- *Started a project with MTU for assembly and test of 114 MTU diesel engines having a power of 2.4 MW (4000 series)*
- *Started a project with Mapna to conduct main overhauls and repairing MTU 4000 engines*



Iran heavy diesel engine manufacturing company is one of the constructive projects out of decimals, which established in 1991 in order to produce medium speed heavy diesel engine with potentials of 270 sets annually, is confirmed in Islamic council parliament and its construction started at 1992 in AMOL. In 1993, considering the article 15 related to budget law, this project separated from ministry of heavy industries and its handling was handed to Iran industries' development and renovation organization. This company has begun its main activity with assembly, maintenance, installation and operation of diesel engines since 1998.

During last years, by assisting young specialists in the field of designing, production, supplying and heavy diesel engines maintenance for marine, rail and power plant applications, this company has become the only brand either in the country or in the Middle East that has acquired achievements and honors in country's industry domains which the most important of them are as follows:

- ✓ *Delivery of 400 set of various types of rail application engines to Islamic republic of Iran's rail way as well as their troubleshooting and maintenance*
- ✓ *constructing more than 10 power generation plant at capacity of 60 MW in different areas of the country*
- ✓ *Producing marine engines for country marine fleet*
- ✓ *Supplying, installing and operating the engines belong to petroleum excavation company*
- ✓ *Designing and manufacturing of dual fuel heavy engine and its opening by respectable petroleum minister*

Iran heavy diesel Company has become an initiative in Iran rail way fleet by assembling and testing various types of the world newest engines in order to their delivery to rail way and other sub-branches.

These workshops are:

disassembly, parts inspection, crankcase washing room, turn over device, mechanical parts sub-assembly, mechanical main assembly, electrical parts assembly, test, painting and finishing works.

Field of activities

- *Management in construction of industrial factories for production of different diesel engines with different applications*
- *Importing machinery and tools for manufacturing sections and end-users*
- *Exporting and after-sales services for company products*
- *Providing maintenance and overhaul services for diesel engine users*
- *Assembly and testing of diesel engines for both end users and other companies*
- *Providing technical services for diesel engine users*
- *Investment, partnership, and authorized activities in the work scope*

Factory

- *Production and assembly workshop*
- *Diesel Engine test cells*
- *Diesels repairing workshop*
- *Manufacturing workshop*
- *QC Laboratory equipped with the unique facilities for quality test of the parts*
- *Store*
- *Production and assembly workshop*
 - *Tools and equipment for engine assembly and overhaul*
 - *High qualified assembly technicians*
 - *QC lab with advanced measurement tools*



- *Test cells*
 - *Having 6 test beds which 4 of them are active and equipped to all required devices for any types of engine's endurance and performance test between 100 – 3600 KW*
 - *Having test rooms that are equipped to water break validated brand such as; TAYLOR .HORIB and SCHENCK*
 - *Having upgraded and universal standard equipment to get international certificates such as; DNV, UIC, etc.*



Designing and engineering scopes of diesel engines

- ✓ *Designing and manufacturing of heavy duty diesel engine related to national engines' family*
- ✓ *Analyzing and simulating all components and engine's lateral equipment*
- ✓ *Developing and changing diesel engines' application*
- ✓ *Organizing special workshop for designing, analyzing and manufacturing of diesel engines*
- ✓ *Codifying and implementing torsion, vibration and sonic test*
- ✓ *Developing rail application engines and achieving approximately 30% of rail power*
- ✓ *Marinating the world latest engines for ferries*
- ✓ *Doing dependent dynamic and structural analyze*
- ✓ *Calculating fluid, thermodynamic and performance*
- ✓ *Designing and simulating marine's components*

Electrical engineering scopes (power and control systems)

- ✓ *Counseling, designing and supervising on power boards manufacturing for diesel generators*
- ✓ *Counseling, designing and supervising on control boards manufacturing for diesel generators in different positions of ferry*
- ✓ *Counseling, designing and supervising on manufacturing of driving engines' control system boards in different position of ferry*
- ✓ *Training power and control system for various types of diesel engines on level operation, middle and main*
- ✓ *Training control monitoring systems for ferry driving engines on level operation, middle and main*
- ✓ *Training the requisite electrical control accurate devices at ferry recommended equipment*
- ✓ *Training SIEMENS control monitoring software such as; SIMATIC MANAGER. WINCC. WINCC FLEXIBLE on three distinct levels*

- ✓ *Counseling, designing and supervising on electrical systems' installation using for various diesel emergency or never-ending power plant*
- ✓ *Counseling, designing and supervising on electrical systems' installation for diesel engines test rooms*

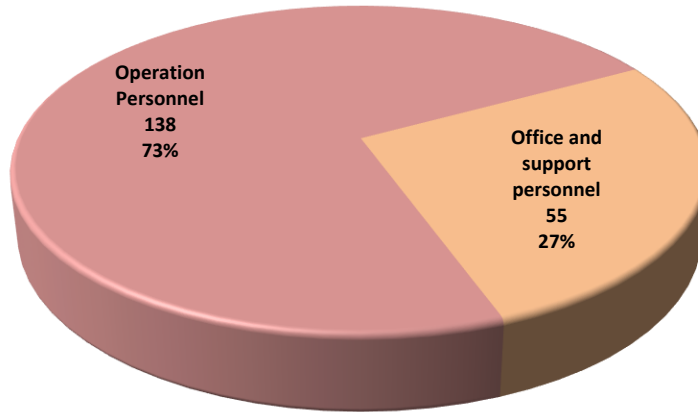


The reference laboratory for calibration and test (having endorsed cooperation certificate for standard organization)

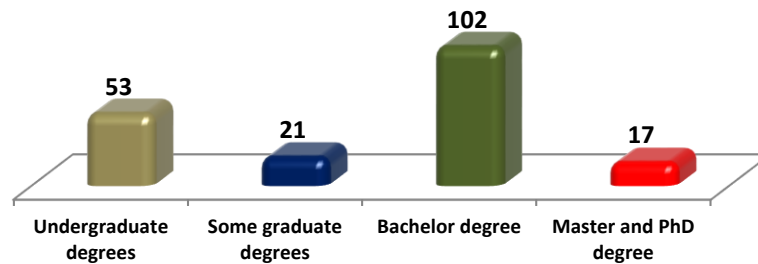
- ✓ *Calibrating various types of caliper, depth measuring gauge , micrometers, vertical measuring device and torque meters*
- ✓ *Calibrating filler gauge, dial gauge*
- ✓ *Measuring all light duty vehicles and engine's components geometrical and dimensional measurement*
- ✓ *Measuring surface roughness (clearance) on various surfaces of machined components*
- ✓ *Calculating lack of confirmed measuring in calibrations and tests*
- ✓ *Calculating optimum power measuring in the calibration and test procedures*
- ✓ *Estimating the calibration timespan between various types of quantities according to Iran defensive standard*
- ✓ *Metrology of various types engine and lateral equipment*



Human resource scope



details of human resource line up according to level of education



DESA’s potentials in the scopes of heavy duty diesel engines’ maintenance

- **Planning systematic periodical inspection**

This company is able to present detailed and systematic program, replacing different parts and repairs at different levels by applying staff’s technical and skillfully capabilities as well as different engines’ documents.

- **Presenting technical services and supports**

DESA is utterly ready to make contract and do perfectly maintenance service and all predicted services with companies and factories which have many types of diesel engines in different applications. That’s coherently could be done by allocating resident specialist if both parties recognize or take it into account.

- **Troubleshooting**

Undoubtedly, one of the main perfect and well done work’s procedures is exact finding of the failure reason. This company, regarding to its skilled and trained staff, is ready to render services to its compatriots for diagnosing different diesel, dual fuel and gas fueled engines.

- **Presenting different checklists**

Regarding to proper operation of an engine, there is a close relation to engine’s running-in and shutting down as well as engine’s performance in various loads and circumstances. Our specialists and engineers are able to present checklist of how an engine could be operated and shut down in addition specific tables in order to record the engine operational steps.

- **Supplying maintenance instructions**

Definitely, the variety and the abundance of equivalent engines in industry require a maintenance manual book for any engines that become accessible for a user in order to not being encountered difficulty in operating time due to the dimensional limitation for many parts.

- **Presenting all maintenance services at different levels till overhaul**

DESA Company is ready to do complete overhaul and reform the light and heavy duty diesel, dual and gas engines for different applications on site or into DESA considering its specialists and their practical and functional training terms for maintenance in reputable and validated companies.

It is to mention that, regarding to different test cells in factory and after engine maintenance, the company can test the engine via different dynamometer. Furthermore, the repaired engines in the factory will be thoroughly painted, in such a manner that the repaired engines are completely the same as the new engines in terms of both power and the appearance.



- **Supply of components needed for the repair engines**

Due to the mutual contracts with world-leading engine manufacturers, DESA has no problem for supply of components needed for the repair engines and can procure the components directly from the original manufacturers which is a good warranty for well-structured components and to a higher degree good engine operation.

- **Inspection and repairing of different components**

Due to the high qualified personnel and equipment, DESA can inspect and repair (both minor and major) components such as cylinder-head and liner of engines with different applications. These include repairing or changing items such as valve seat and guide. Examples for successful achievement are repairing MAN and MTU cylinder-heads. Moreover, due to the crack-detection equipment (such as UT, MT and PT) which DESA owns, careful inspection of all engine components and detection of component cracks are possible which prevents any risk in using the components.

- **Leakage tests**

One of the major problems which is common in different engines, is the water or oil leakage from different engine parts such as coolers and liner O-rings. Due to the hydraulic pressure test equipment which DESA



owns, careful and standard pressure test of block, coolers, cylinder-heads and etc. to detect and remove leakages are possible.

- ***Technical and repair services in operation during travel***

One of DESA's successful achievements was management, maintenance and repairing of engines in operation, in projects such as gen-set wagon and train-set self-propulsion trains. DESA is ready to send qualified technical personnel with rail engines, to assure the customer that all technical issues are prevented and in case of any technical failure it can be resolved quickly during the travel. It should be mentioned that all disassembly and repairing activities either in the factory or at customer's site are conducted based on standard documents, and best calibrated equipment and instrumentations are used for components investigation in order to validate the acceptable performance of all components.

The stages of heavy diesel engine repairing



The figure of repair engine sent from railway



The stage of disassembly and receiving repair engines



Disassembled engine block



Turnover station to enhance assembly and disassembly activities



The stage of cleaning all bearing seating surfaces and crankshaft oil drillings



Engine block turnover tool to wash and inspect different sections



Separation of usable and rejected components



Equipped laboratory for careful components measurement



Continuous presence of quality control inspectors to ensure high quality assembly and test procedures



Ensuring the quality of moving and rotating surfaces



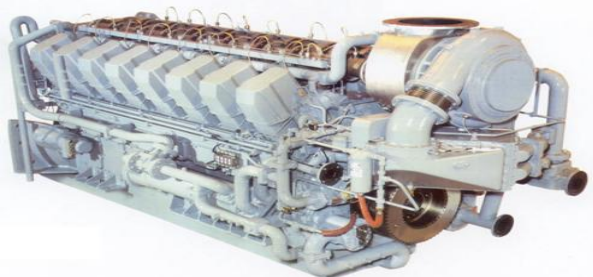
Assembly the engines based on standard procedures



Pre-assembly section



Disassembly of components and technical inspection and service



RK215 engine after completion of assembly stages



Disassembly, washing, component inspection, NDT on firing surfaces, leakage test, seating valves, etc.



Sending the engine to test cell, installing electrical and mechanical joints, engine loading based on test procedures



Packaging station



Washing, painting and complementary activities

The activities done in the field of heavy diesel engines repairing

❖ *Repairing 50 Ruston engines.*

- *Contract subject: supply of components, main overhaul and testing 50 RUSTON 16VRK215 engines*
- *Customer: Islamic Republic of Iran Railway.*



❖ *Repairing MTU4000 engines.*

- *Contract subject: Repairing and delivery of Mapna MTU4000 engines.*
- *Customer: Mapna Company.*



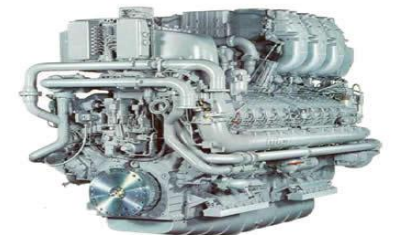
❖ *Repairing MAN2842 engines*

- *Contract subject: Repairing and delivery of MAN2842 engines*
- *Customer: Wagon Pars Company.*



❖ *Repairing MTU 538 engines*

- *Contract subject: supply of components, main overhaul and testing MTU538 engines*
- *Customer: Shahid Rasouli Industries.*





DESA's training department

Human resource

Regarding the availability of skilled employees and graduated students at DESA as well as they are trained and certified by the most reputable companies in the world, the technicians, engineers, and designers of this company are ready thoroughly to represent their achievements.

Besides, DESA's individual facilities and fundamentals have caused special potential within this domain. Issuing and codifying applied training booklet for all employers' considered engines also the presentation of practical and theoretical objects are DESA's training department honors.

The specialists of this company are trained and certified by the world validated companies such as; AFS . MAN .RUSTON .WARTSILLA .MTU , TECHNOMOT in Finland, England, Germany and Canada in designing, assembly, test, maintenance, implanting and UIC test supervision for dual fuel and light duty natural gas engines, development of maritime industries.

DESA's managers do believe that work staff is the most important factor for each organization, so the training is being taken into account and has valid history in DESA.

The main targets of training department at DESA:

- Updating the science*
- Achieving new skills*
- Implementing and orientating attained skills in the organization activities*
- Training to organizations, companies and institutions (gaining international training reputable brand)*
- Gaining acceptable index in country's scientific output*
- Holding congress and professional workshops*

Finished training terms

Some of training terms which DESA's employees passed are as following table:

<i>Training venue</i>	<i>Training title</i>
<i>MAN England</i>	<i>General training of Ruston engines</i>
	<i>Ruston assembly and test procedures</i>
	<i>Ruston engines' maintenance</i>
<i>MTU Germany</i>	<i>Assembly of MTU engines</i>
	<i>Training of MTU's after sales service</i>
	<i>Training of MTU engine's test</i>
	<i>Power line 4000with ECU-7</i>
<i>CP England</i>	<i>Training of CP software</i>
<i>Waretsilla Finland</i>	<i>Training of Wartsilla engines</i>
<i>AVL congress Austria</i>	<i>Gas engines' workshop</i>
<i>Technomot England</i>	<i>Engine design</i>
<i>IPCO</i>	<i>Engine manufacturing's workshop</i>
	<i>Architectural design workshop for engine's ECU</i>
<i>Islamic republic of iran railway</i>	<i>Training of train set driving</i>
<i>EBASTO</i>	<i>Rail application heating systems</i>
<i>Easy laser</i>	<i>Measuring and leveling system</i>
<i>Vocational training center</i>	<i>Accurate tools</i>
	<i>Working with thermal meters</i>
	<i>Industrial drawing power</i>
	<i>Welding(manual electrical arc, E6, G3, G4, covered gas grade 1st)</i>
	<i>Welding inspection and non-destructive tests</i>
	<i>Training of marine engines</i>
	<i>CATIA software</i>
	<i>Hydraulic and pneumatic (basic, advance, electricity supply control)</i>
	<i>PRO/E software</i>
<i>Solid works software</i>	
<i>DESA</i>	<i>Training of marine floating</i>
	<i>Training of OM457 engine diagnosing device</i>
	<i>Maintenance of MAN 2842</i>
	<i>Production procedure</i>
	<i>Basic concepts of quality management system</i>
	<i>Training of ISO documentation</i>
<i>Internet and security of network</i>	

<i>Training venue</i>	<i>Training title</i>
	<i>ISO 2008 - 9001</i>
	<i>Management in general</i>
	<i>APQP</i>
	<i>QFD . COQ .CIP .5S</i>
	<i>EDS</i>
	<i>FMEA and necessities' training</i>
	<i>OM457 engine training</i>
	<i>Process control and product's evaluation</i>
	<i>CREO software</i>
	<i>Safety in laboratory and risks of chemical materials</i>
	<i>Industrial electrical power</i>
	<i>Developing test general introduction</i>
	<i>D87 assembly training</i>
	<i>Measuring principles and tools recognition</i>
	<i>Diesel engines and national gas engine fuel system (HEINZMAN)</i>
	<i>Resilient couplings alignment</i>
	<i>Storage procedure, product preservation and delivery</i>
	<i>Purchase and supply procedure</i>
	<i>Actuator assembly and its internal parts recognition</i>
	<i>Internal combustion engines theoretical concepts</i>
	<i>Training of engine's performance analysis</i>
	<i>GT POWER software</i>
<i>West training and develop center</i>	<i>AVL-FIRE Software</i>
<i>Noshirvani industrial university develop center</i>	<i>Research and development and its position on economical realtors</i>
<i>Andazeh Negasht</i>	<i>Measuring and calibration</i>
<i>Iran industrial research center</i>	<i>Project management and planning</i>
	<i>Communicating management to the customers (CRM)</i>
	<i>The principles and ways to establish technical archive</i>
<i>Tof navard academy</i>	<i>Balanced preferential card B.S.C</i>
	<i>IRIS standard</i>
	<i>Training of marketing management</i>
<i>Industrial management organization</i>	<i>ISO 17025 training principles and internal audit training</i>
	<i>Executive management</i>
<i>Idem Tabriz</i>	<i>Training of Primavera</i>
	<i>Familiarizing diesel engines assembly and manufacturing</i>
<i>QMS company, the research and development center of work safety and protection regulation</i>	<i>OHSAS 18001</i>
<i>SWIQ company</i>	

<i>Training venue</i>	<i>Training title</i>
	<i>Training of welding via Argon</i>
<i>Govah company</i>	<i>Engine maintenance series 457, 500, 900</i>
<i>Mazandaran Industries head office</i>	<i>Degenerating sedimentation of steamers</i>
<i>Modern System Alborz</i>	<i>Training of intermediate connecting system</i>
<i>Canteronic training center</i>	<i>Mechanical desktop software</i>
<i>Itako, Andazeh Negasht company</i>	<i>Dimensional and geometrical toleration (GD&T)</i>
<i>Mashahir Paytakht</i>	<i>Training of Rapid form</i>
<i>ELIN EBG company</i>	<i>SCADA control system planning</i>
<i>Ameed company</i>	<i>CHP systems design</i>
<i>Petrodad Danesh company</i>	<i>Training of Flow master</i>
<i>Iran's standard institution</i>	<i>The calculation principles of lack decisive action in test results</i>
<i>Sharif industrial university</i>	<i>Ocean engineering principles</i>
<i>Tehran Khat Ramz company</i>	<i>Training of EFQM</i>
	<i>Training of total management quality</i>
<i>CIMAC congress</i>	<i>the workshop of internal combustion engines turbocharger conformity and its selection</i>
	<i>Training of sound, vibration and turbulence</i>
<i>Casting founders society</i>	<i>Training of the defects of cast iron and steel products</i>

Training courses from DESA

DESA is able to have training courses in technical affairs as follows regarding the availability of skillful employees as long as proper fundamentals of software and instruments

- *full description of engine maintenance and troubleshooting*
- *Full engine and lateral equipment training – basic operation*
- *Full engine and lateral equipment training – intermediate*
- *Full engine and lateral equipment training –main*
- *Internal combustion engines' design – diesel engines*
- *Engine test*
- *Familiarizing non-destructive test strategies*
- *Familiarizing tools and engine test chamber*
- *Familiarizing steels and cast irons nomination and their application in engine*

- *Diesel engines rail application standard (UIC)*
- *Marine diesel engines standard (DNV)*
- *Air pollution, control planning, and equipment design*
- *CHP and its application*
- *Simulating combustion cycle and formation air pollutant in diesel engines and the effects of its specification on engine's performance*
- *Piston's structural and thermal analysis*
- *Crankshaft torsion vibration analysis*
- *Production planning*
- *Project managing and planning*
- *Projects feasibility*
- *Storekeeping and store planning*
- *Supply chain management*
- *Maintenance planning*

Syllabus of above training terms would be announced to applicant organizations if requires

Training facilities

Training course

An appropriate visual and hearing course with peaceful and convenient atmosphere for training activities has been established. Meanwhile, having different training terms and getting the feedback of customers' worthwhile concepts show the satisfaction of given services.



Production and test area

The production and test working area are equipped with exclusive facilities for practical training. The fact that caused DESA's specific capability in training is; many year's experiences and sciences in heavy and semi heavy diesel engines as well as collaboration with engine manufacturers in the world in order to domestic marketing of this tremendous science.



Trainee's locating

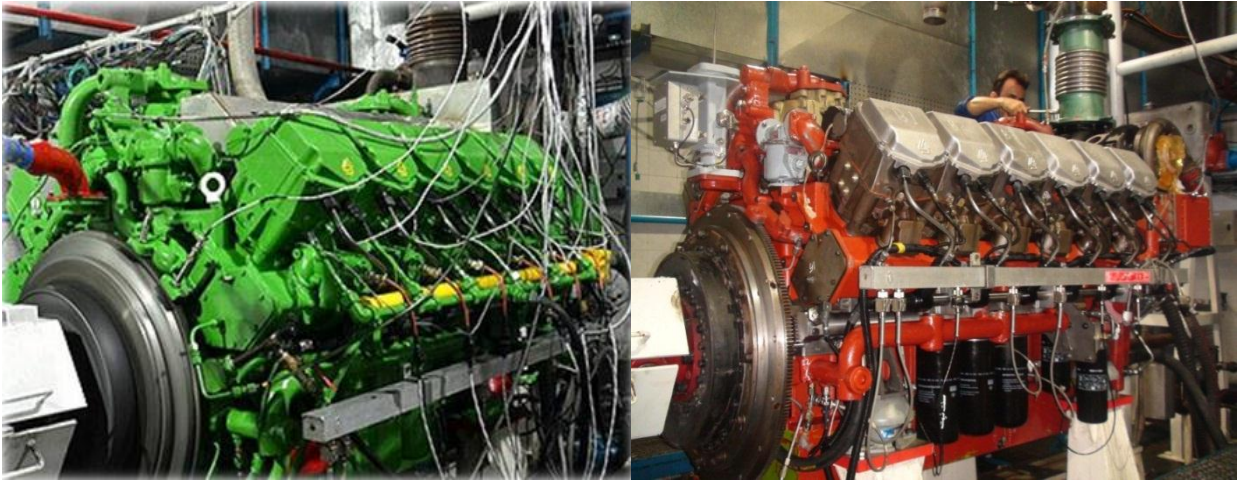
DESA's guest house with its relaxing and peaceful environment and services will be rendered to trainees. Its unique environmental view also its adjacency to the training courses has created a favorable condition.



Finished training courses and Ongoing training courses that committed to sign contract

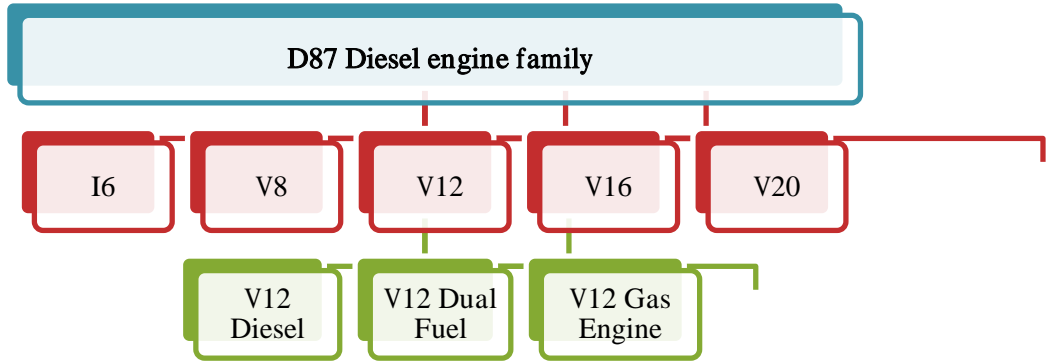
- *Full engine and its lateral equipment training – pielstik (O,I,D)*
- *Project planning and management*
- *Full engine and its lateral equipment training – Gen- set MAN 2842 (O,I,D)*
- *Fluid flow analysis via ANSYS – FLUENT software*
- *Piston 's structural and thermal analysis*
- *Crankshaft torsion vibration analysis*
- *Simulating combustion cycle and formation air pollutant in diesel engines and the effects of its specification on engine's performance*
- *Marine gas turbine*
- *Marine diesel engines*
- *Marine gearbox*
- *Marine driving systems*

D87 Project

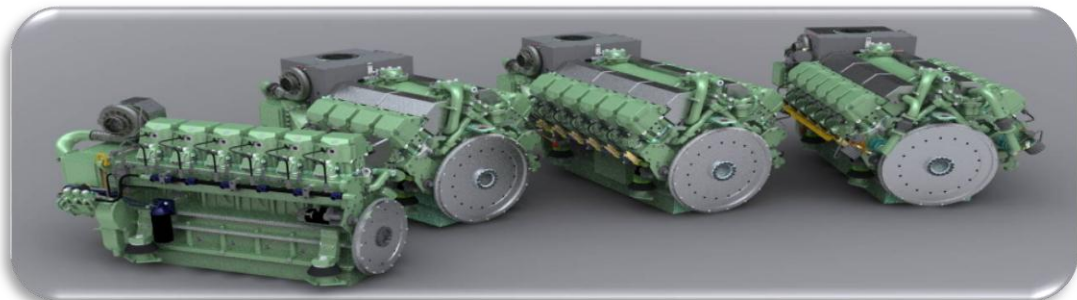


- ✓ *Providing heavy Diesel engine requirements of different applications including railway, marine, industrial and genset*
- ✓ *Obtaining the know-how of design and manufacturing of heavy Diesel engine*
- ✓ *Becoming familiar with up-to-date engine design standards in terms of materials selection, material usage, pollutant emissions, and fuel consumption*
- ✓ *Becoming as one of the designers and manufacturers of heavy Diesel engines*
- ✓ *Production of a family of heavy Diesel engines*
- ✓ *Creating 400 to 2000 direct and indirect job vacancies and promoting personnel technically*
- ✓ *Providing national and international engine engineering and after sale services in all fields of heavy Diesel engines*
- ✓ *Optimization and uprating of other engines*

DESA D87 engine



<i>Parameter</i>	<i>unit</i>	<i>6-inline</i>	<i>V8</i>	<i>V12</i>	<i>V16</i>	<i>V20</i>
<i>bore</i>	<i>mm</i>	<i>150</i>	<i>150</i>	<i>150</i>	<i>150</i>	<i>150</i>
<i>stroke</i>	<i>mm</i>	<i>180</i>	<i>180</i>	<i>180</i>	<i>180</i>	<i>180</i>
<i>Engine volume</i>	<i>liter</i>	<i>19.09</i>	<i>25.45</i>	<i>38.2</i>	<i>50.9</i>	<i>63.6</i>
<i>length</i>	<i>mm</i>	<i>2150</i>	<i>1860</i>	<i>2290</i>	<i>3084</i>	<i>3996</i>
<i>width</i>	<i>mm</i>	<i>930</i>	<i>1290</i>	<i>1290</i>	<i>1420</i>	<i>1420</i>
<i>height</i>	<i>mm</i>	<i>1210</i>	<i>1290</i>	<i>1290</i>	<i>1419</i>	<i>1548</i>
<i>weight</i>	<i>kg</i>	<i>2600</i>	<i>3100</i>	<i>3700</i>	<i>4800</i>	<i>6000</i>
<i>Nominal power (1800-1500)</i>	<i>kw</i>	<i>550-650</i>	<i>650-700</i>	<i>850-1000</i>	<i>1200-1230</i>	<i>1500-1830</i>



D87 engine family sale vision

<i>application</i>	<i>type</i>	<i>engine</i>	<i>Required number</i>
<i>industrial</i>	<i>V12</i>	<i>Diesel</i>	<i>200</i>
	<i>V20</i>		
<i>Industrial-Gen set</i>	<i>V12</i>	<i>dual</i>	<i>100</i>
<i>marine</i>	<i>V12</i>	<i>Diesel</i>	<i>8500</i>
	<i>V12</i>		
	<i>V16</i>		
<i>railway</i>	<i>V12</i>	<i>Diesel</i>	<i>200</i>
<i>railway</i>	<i>16</i>		
<i>Gen set</i>	<i>V12</i>	<i>GAS</i>	<i>250</i>
<i>Passive defense</i>			