1st Quarter 2017

Issue 121

bulletin

Quarterly Magazine of Consolidated Contractors Company

Jazan Economic City

Saudi Arabia

SAUDI ARABIA

Jazan Integrated Gasification Plant-

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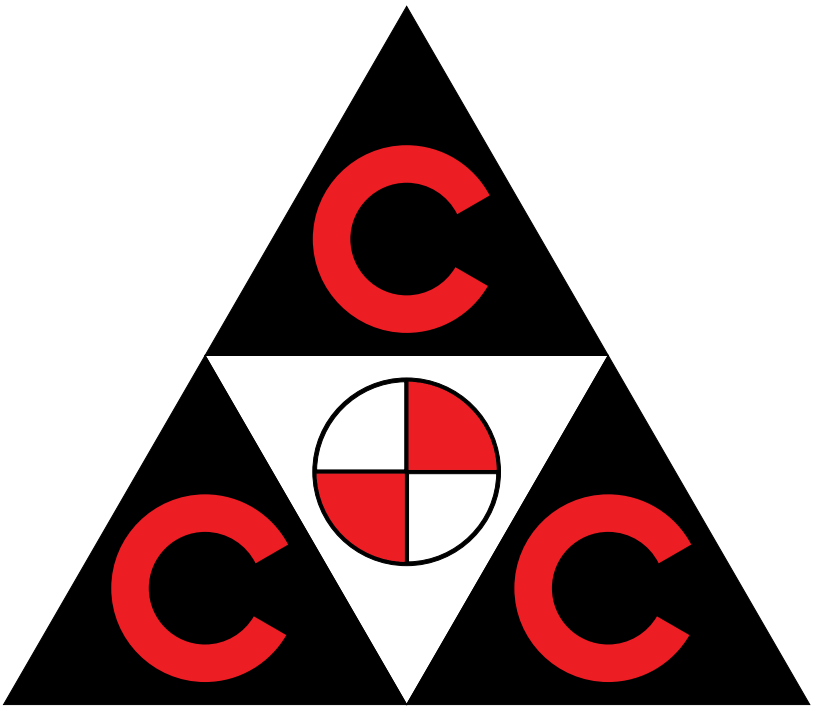


JAZAN: CCC's New Frontier

When more than five years ago Saudi Aramco went ahead with a plan to invest billions of dollars in a port, refinery, petrochemical plant and industrial zones project, CCC took the strategic decision to start planning for and investing in resources in order to play a major part in Saudi Aramco's development plan.

CCC today has four projects in Jazan with a workforce of over 20,000 top-notch employees, site workers (and vast amounts of plant and equipment) in order not only to execute current projects, but to solidify our presence in the course of time for we believe Saudi Aramco has major potential plans for this area in the future.

Like many other large developments in the Gulf, Kuwait, Qatar, Oman and Saudi Arabia (Jubail), Jazan has a bright future and CCC's early entry provides the strategic platform for our company to stay on as a market leader in the years to come.

I wish to thank all those who worked hard to put CCC on the Jazan map. I also wish to thank all those working on our projects in Jazan and assure everyone that CCC is here to stay.

Bu Haseer Early Production Scheme - EPS

UAE

The project scope is the construction work in brownfield that includes civil, piping, E&I (33KV cable), structural steel and painting in addition to precommissioning activities.

The client is National Petroleum Construction Company (NPCC) / CCEL.

The contract was awarded on 19 December 2016.

The project start was 19 December 2016 for a duration of approximately sixteen months ending in April 2018.

Design and Construction of Al Bustan Street North (P007 C7 P2)

Qatar

The scope of work includes the complete design, approvals, permitting and construction of a new expressway, including four grade-separated interchanges with cross roads, frontage roads, overpass and underpass structures, retaining walls, pedestrian and bicycle paths, traffic signs, signals and ITS, landscape, hardscape, artscape, street lighting, surface water micro-tunnel and all related infrastructure.

The client is the Public Works Authorities (Ashghal).

The consultant is Parsons.

The contract was awarded on 20 March 2017.

The project start was 20 March 2017 for a duration of approximately 41 months ending in August 2020.

Mall of Oman Package 2 Main Works

Oman

The Mall of Oman is a three-level shopping centre with a total leasable area of 144,700m2. The building includes 350 retail units, a hypermarket, a children's entertainment zone, a snow park, a mix of underground and on grade car park and all associated external and infrastructure works. The total built up area is 387,193m2.

The client is Majid Al Futtaim Properties (Oman) LLC. The contract administrator is AECOM. The engineering consultants are Parsons / Infracad.

The project is a joint venture with Shapoorji Pallonji Mideast LLC (SP) (50/50).

The contract was awarded on 7 February 2017.

The project start was 8 February 2017 for a duration of 37 months ending on 5 March 2020.

Saudi-Bahrain Pipeline Project Offshore EP and Installation, Al Qurayyah

Saudi Arabia

Provision of manpower and equipment to perform onshore works at Qurayyah. The works include mobilization, construction of pipeline trench, installation of new 30" U/G and A/G pipeline segment, assistance for pipeline hydrotesting and precommissioning, assistance for pipeline and cable shore pull at Qurayyah, construction of thrust anchor, installation and maintenance of dewatering system, installation and testing new onshore fibre optic cable, installation of temporary CP system and complete ICCP system and fencing with security gates for dedicated CP area.

The client is National Petroleum Construction Co. (Saudi) Ltd. (NPCC) and the Owner is Saudi Aramco.

The contract was awarded on 5 January 2017.

The project start was 1 March 2017 for a duration of six months ending on 30 August 2017.

The Construction of Kalabo-Sikongo-Angola-Bodergate Road

Zambia

Construction of an 85km single carriageway road with asphalt surfacing. The works include earthworks, layer works, chemically stabilized subbase, crushed stone base, asphalt surfacing, culverts, ancillary works and one bridge (75m, 3 span) at Sikongo.

The client is the Roads Development Agency.

The consultants are Wanjohi Consulting Engineers, Kenya, and Industrial & Engineering Consulting Office (INCO), Kuwait.

The contract was awarded on 12 December 2016.

The project start was 12 January 2017 for a duration of about 27 months ending on 30 March 2019.

Construction of Gaborone to Boatle to Dual Carriageway Standard

Botswana

The scope includes upgrading the existing 18.4km long Gaborone to Boatle Road to dual carriageway standard including construction of two bridges, a grade separated interchange with overbridge, culverts, kerbstone, roadbed, earthworks, lower and upper SSG, stabilized subbase, crushed base course, asphalt surfacing, street lighting, traffic light and road signs.

The client is the Ministry of Transport and Communications.

The consultant is Bothakga Burrow Botswana Pty Ltd.

The contract was awarded on 10 February 2017.

The project start was 24 March 2017 for a duration of two years ending on 23 March 2019.

M. SOUFYAN

Field Engineering (Part Two)

Introduction

In this section for field engineering we are going to consider the following processes:

- Technical queries.
- Field changes.
- As built preparation.

The subject of shop drawings as a main function of field engineering was introduced in company Bulletin No. 120.

Technical Queries

Introduction

A technical query is a question of a technical nature raised by one party to another party, usually related to construction work. A technical query is usually related to a contractual issue that requires a formal reply. A technical query must be registered within the Document Control Group and must follow official review, approval and distribution process.

Who Can Raise a Technical Query?

Usually, technical queries are raised by site engineers, project engineers or section engineers. Once completed the technical query must be passed to the Field Engineering Department.

At this stage, the Field Engineering Department should register the technical query by obtaining a registration number from the Document Control Group.

Who can Process a Technical Query?

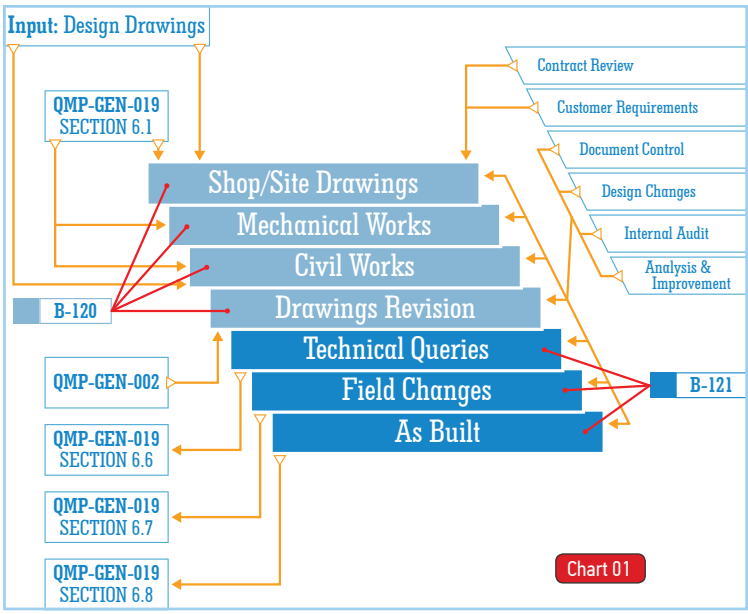
There are two ways to process a technical query:

- By the Field Engineering Department or
- By the design authority.

Technical queries may be processed and closed out by the Field Engineering Department only when they can be answered easily from data and information available to the field engineering team. Caution should be exercised that all relevant data is available, up-to-date and accurate and there is no room for error. In any other case the Home Office engineering organisation should be referred to and be involved in the resolution of the technical query.

Technical Query Resolved by Field Engineering Department (FED)

Where the TQ is processed within the Field Engineering Office the following process shall be applied:



- Review all the data provided with or referred to by the TQ (check for missing data or references).
- Review knowledge base and other data available on the subject.
- Review engineering options available.
- Where possible, discuss the TQ with the Home Office Engineering (HOE) Organisation.
- Conduct investigations, run calculations, confirm solution, check and verify.
- Prepare sketches, drawings.

Complete TQ response and return to DCG for distribution.

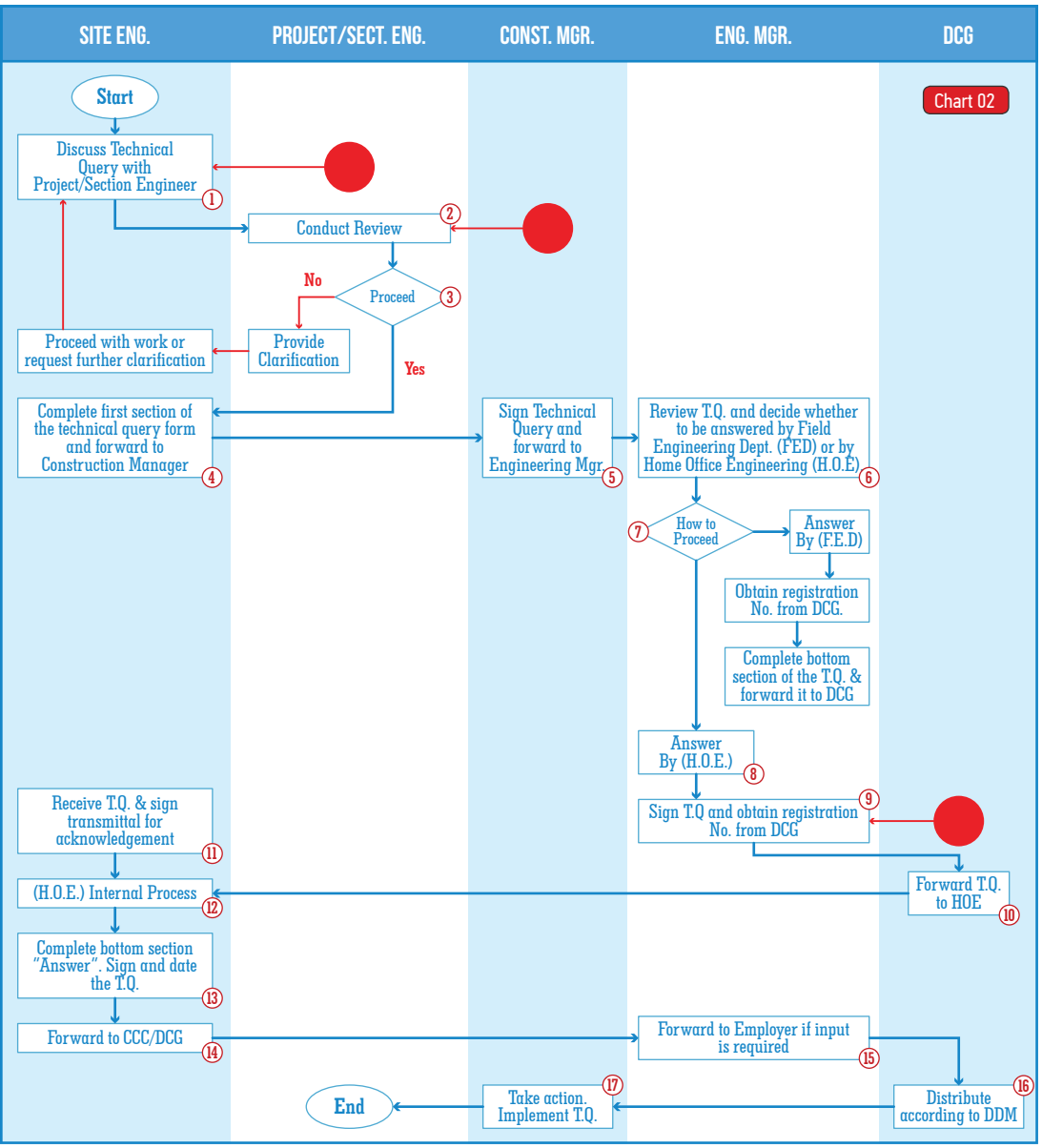
Technical Query Resolved by Home Office Engineering (HOE)

Where the TQ is processed by the HOE organisation the appointed engineer will arrange through DCG for the issue of the TQ to HOE organisation and provide any additional data or information requested by them. On return of the TQ the appointed engineer will review the reply and take action accordingly.

Where an engineering solution has been provided through a TQ and where it is appropriate, TQs should be followed up by the engineer concerned to confirm that the engineering solution was satisfactory. Where applicable the engineer / draughtsman will carry out a drawing revision based on the TQ information provided by HOE and reissue the drawing through DCG, who shall distribute copies according to the Document Distribution Matrix (DDM).

Field Engineering (Part Two)

TECHNICAL QUERY WORKFLOW



The degree to which the customer or consultant or HOE is involved in the Technical Query process varies according to the customer or consultant concerned.

This process is illustrated in Chart 02.

Field Change

Introduction

Construction projects may vary in nature, size and complexity. No matter what type of project the organization is dealing with, all projects have many common features; one of them is field change. During construction many decisions have to be made that may affect the design or the methodology of execution of a certain part of the project that may lead to a field change.

Field changes have to be carefully managed to ensure that the organization is proposing a better technical solution with no negative effect on quality, health, safety, or environment (QHSE). Any effect must be determined and a proper solution provided. In addition, the organization must determine any possible effect on cost and schedule.

Is the Field Change Required?

The potential Field Change Request (FCR) will be subject to discussion between Field Engineering personnel and the originator (Section Engineer) before being documented. An FCR should be avoided wherever possible. Where there is a clear need for a Field Change Request, it will be the responsibility of the Section Engineer to raise the FCR in conjunction with Field Engineering. Attached to the FCR will be all supporting data (sketches, calculations, drawings and where appropriate photographs showing the site conditions). The Field Engineering Manager will appoint a Field Engineer for the preparation, production and collation of the attachments to the FCR and to ensure their standards.

The Engineer / Consultant Review

The Field Engineering Manager will arrange for the FCR to be transmitted to the customer or engineer / consultant via DCG. The FCR will

Field Engineering (Part Two)

be returned as either approved, approved with comments or not approved. Where a not approved response is received then the FCR will either be abandoned or presented with a different approach.

Processing the FCR

The appointed Field Engineer will review all approved FCR's for their potential side (or "knock-on") effects. One FCR may have implications for a number of systems and sub-systems and cause changes to several documents. Such changes will be listed and controlled.

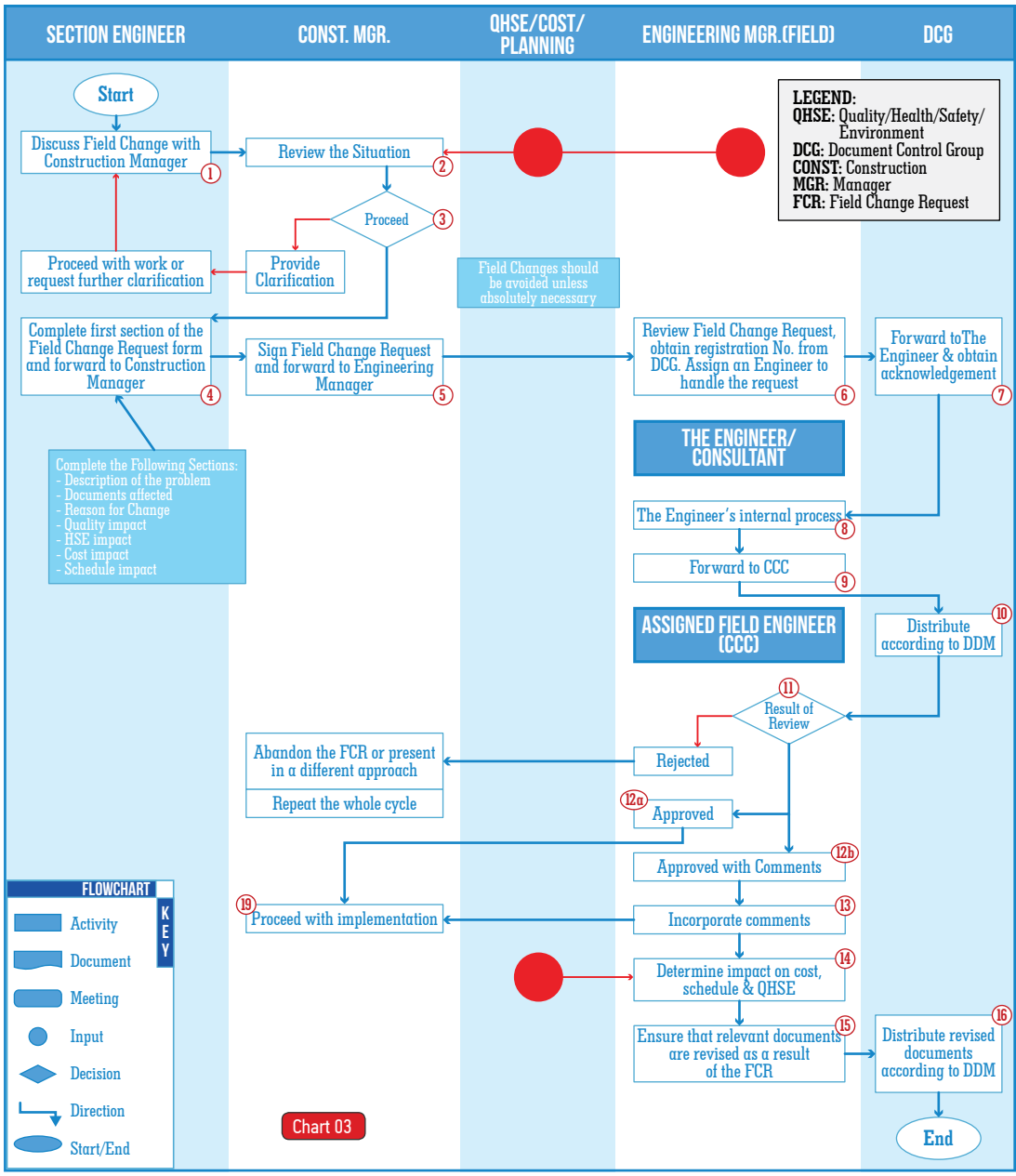
The appointed engineer will evaluate and determine the following variables related to the change request:

- Quality Impact.
- Safety Impact.
- Cost and commercial aspects.
- Programme / schedule effect.

Personnel from the various disciplines and departments will be consulted as necessary and the results recorded on the field change request form.

Processing the field change request is illustrated in Chart 03.

FIELD CHANGE WORKFLOW



Distribution

The FCR will be issued through DCG to all holders of the relevant drawings and documents, holders will be requested to attach the FCR to the relevant documents and commence working to the changed scope of work.

The change(s) requested by the FCR will be included in the redline mark-up drawings (provided the changes were implemented), and eventually will be included in a revised drawing or the as built.

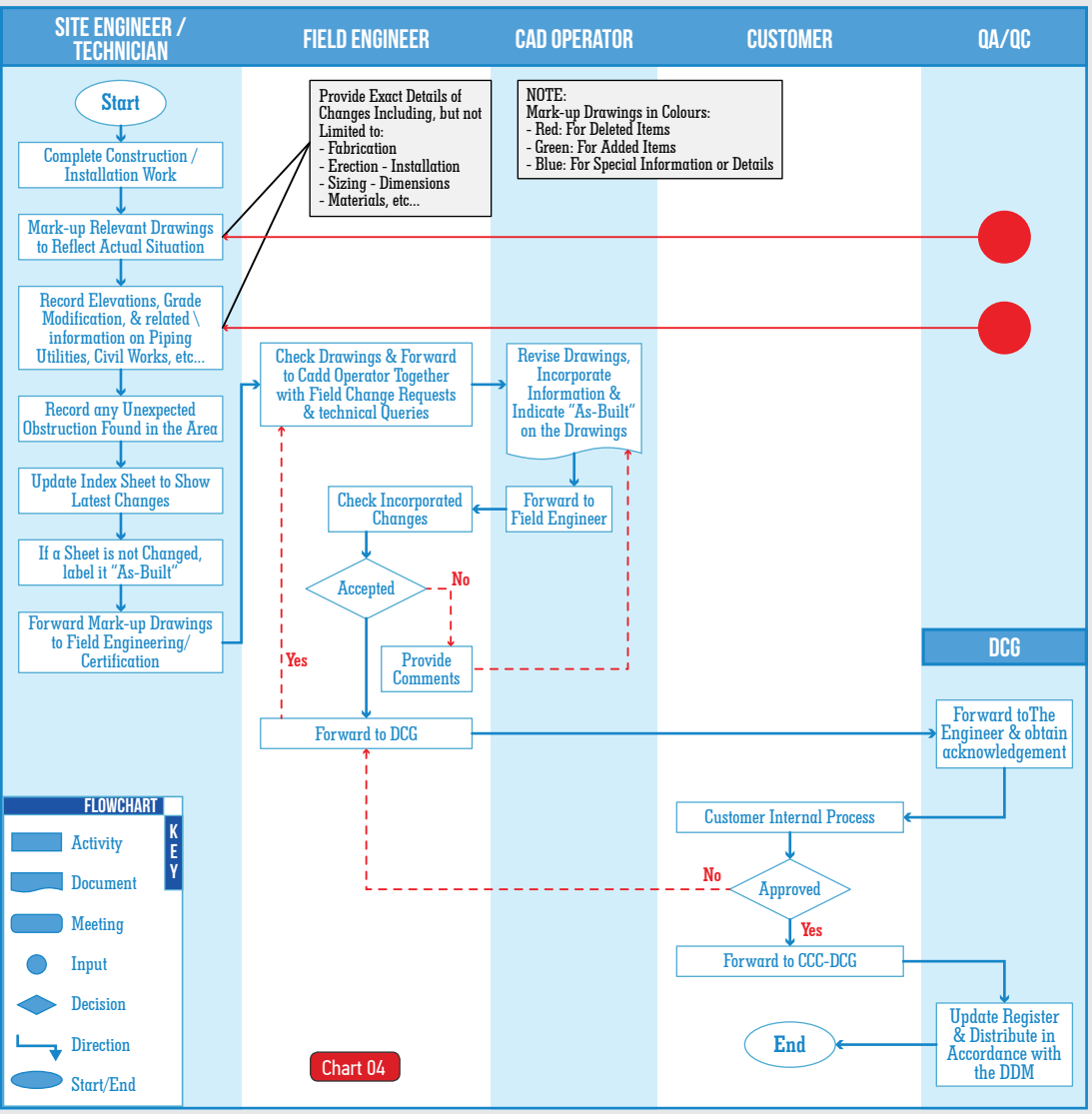
As-Built

Introduction

As-Built in construction is equivalent to "as is", therefore, as-built drawings show the existing conditions as they are.

Field Engineering (Part Two)

AS BUILT WORKFLOW



The as-built represents a set of revised drawings submitted by a contractor upon completion of work or a project. The as-built reflects all changes made in the specifications or drawing during construction work, they show the exact dimensions, location, levels and all elements of the completed work.

Recording of Information for As-Built

Redline mark-ups will be produced immediately after construction is completed. A qualified technician from the Construction Department in coordination with the Site Engineer in charge of construction work will collect accurate data and redline the construction drawing.

Processing of As-Built

Redline mark-up drawings will, when finalised, be passed to the Field Engineering Department and the Certification Department (who need them for test packs and completion certification).

The redline mark-up drawing will be provided to the CADD/Software Operator, together with all other documentation pertaining to the drawing concerned (field change requests, Technical Queries and so on). The CADD/Software Operator will raise the drawing by one revision and indicate in the description of revision the words "AS BUILT".

When all revision has been made to the drawing the CADD Operator will take time to check the changes before giving the document to the Field Engineer concerned. The Field Engineer will check the as-built drawing to ensure that drawing protocols have been complied with (symbols, lines, clouds and so on) and have any discrepancies corrected before issuing the as-built drawing to the customer through DCG.

The as-built process is illustrated in Chart 04.

Customer Approval

The as-built drawing will be returned from the customer either "approved" or "not approved". Not approved as-built drawings will be discussed; drawings revised and resubmitted until all drawings reach "approved" status. Once approved, as-built drawings will be issued by DCG, in accordance with the project Document Distribution Matrix (DDM) Programme / Schedule effect.

The Jazan Vision

FEATURE

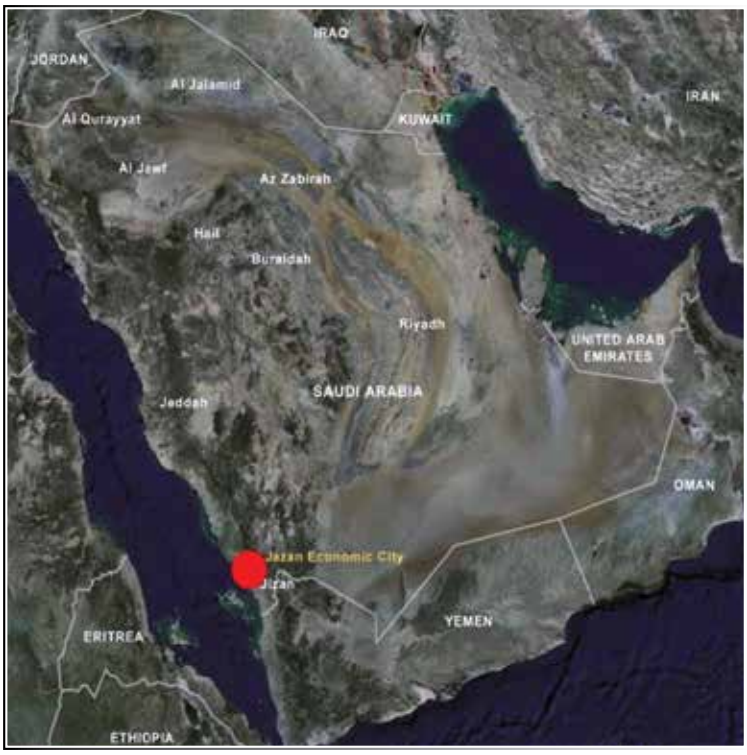
A royal decree in 2006 established Jazan Economic City (JEC) a visualization of the future of Jazan. The vision was to construct an industrial hub in the province of Jazan. The introduction of such a project was of great economic advantage for both the province and the kingdom as a whole due to the strategic position of the city which is in proximity to international shipping routes and the Horn of Africa. The construction of JEC also includes an international airport and a mega port. JEC was later the subject of another royal decree to assign the management and operation of JEC to the royal commission in 2015 making it the fourth city after Jubail, Yanbu and Ras Al Khair industrial cities.

The progress in JEC has influenced the economic and social life of the province. The indirect effect of this project was witnessed in the development of other projects like roads, utilities and other infrastructural projects; fostering the rise of new businesses, an increase in real estate demand and opening of new markets. Even though the construction industry was affected by the downfall of oil prices, the commitment to the completion of JEC by the kingdom through Saudi Aramco is strong and remains unchanged.

At the end of the project, JEC is expected to become a city with great value added towards the economy of the kingdom where the city will become an industrial hub where heavy, medium and light industries have been established.

The development of this city will generate tens of thousands of jobs directly and indirectly to help the economy of the area. Saudi Aramco has implemented a strict Saudization policy in all its contracts to ensure the development of local skilled workers and provide work opportunities. Saudi Aramco also invested in the development and training of Saudi youth to suit the requirements of the market in the construction phase of JEC and later phases, with the establishment of technical institutes to train locals to handle job requirements. By doing so, the kingdom ensures the economic stability of the region and creates new opportunities for the people of the province mainly and the kingdom as a whole by providing job security for generations to come.

Jazan Economic City consists of a refinery with a 400,000 BPSD capacity, a port and the world's biggest Integrated Gasification Combined Cycle (IGCC). The IGCC has a design feed with a capacity of about 110MBD of Vacuum Residue (VR)/ or High Sulfur Oil (HSFO), which will supply electrical power to run the refinery and export to the grid a minimum capacity of 2400 MW of net



power supply to meet the growing demand for electrical power. The port will help in exporting products from JEC and the province to world markets.

CCC has been awarded a share in this mega project. CCC's share is divided into four projects:

- **Jazan Refinery Tank Farm (JRTF):** the project consists of the civil works for the tanks and the interconnecting pipes between the tanks and refinery.
- **Sulfur Recovery Unit (SRU):** is a typical unit using the Claus reaction to recover sulfur. It consists of a common area and three typical trains equal to 541 tons per day of sulfur recovery.
- **Soot Ash Removal Unit (SARU):** consists of a common area and four typical blocks with a capacity equal to 788 KG/Hr of ash recovery.
- **Jazan Refinery Utilities Project (JRUP):** consists of the infrastructure, utilities distribution for all the plant such as storm water, oily water sewer, fire water, drinking water, power with the addition of roads and street lighting.

All of these projects are still in the construction phase and are home to around twenty thousand CCC employees.

Jazan Refinery & Terminal Project (JRUP)

Overview

On 13 March 2015 CCC was awarded the Jazan Refinery and Terminal Project (EPC 13 Utilities Packages). This project is part of the Jazan Refinery Project developed by Saudi Aramco. The client is Hitachi Technology Company.

CCC's scope of work includes civil, M&P and E&I works for the refinery and the marine terminal to develop the utility block and the common area of refinery consisting of: nitrogen, air system and condensate, utility water (oily / sewer / potable), cooling water, fire water, common networks and central control building, substations, operations and maintenance building and refinery roads asphalt paving.

The project started on 1 May 2015 and is expected to be finished by April 2018.

Jazan Management Quarterly meeting with Samer Khoury

JRUP Overall Camp View

Project Conditions

The project is located around 60km to the north of Jazan city, on the Red Sea coast. This zone has a hot desert climate. The weather is very hot all year round and the average annual temperature is one of the hottest in the world, even in its short winters. Jazan experiences harsh weather and daily sandstorms from the end of May till August every year, besides sudden heavy rains. This has an adverse effect on the site activities and the living conditions on the project.

The project start in May 2015 was marked by difficult political and safety conditions due to the war in Yemen. These conditions had a great effect on staff and manpower recruitment for the project as most people were afraid to come to Jazan. In addition, the project faced a lot of other challenges such as a lack of hotels and facilities around the project location, poor infrastructure in the nearby zone, lack of suppliers in the region and so on.

Mobilization and Start

The big challenge was that both the permanent works and the mobilization sequence began with limited resources at the early stage and the city lacked the necessary infrastructure in terms of accommodation facilities. However, the project started in May 2015 and from the first day the project team tried to organize a successful mobilization and at the same time to meet the client's requirements by starting the construction activities at the earliest possible time. In the first few months the project team succeeded in commencing the construction works on site (civil works in

particular), while the mobilization of the camp, staff and manpower was ongoing.

Project Achievements

Despite all the difficult conditions and challenges listed above the project succeeded in making many successes in different categories, as follows.

1. HSE

- The project team aimed to conduct its operations in a safe and efficient manner, targeting zero harm. The project applied safety training and inductions, awareness campaigns and toolbox talks with close site work monitoring by HSE supervisors.

  The project succeeded in scoring 21,673,233 Man hours LTI Free.

- The project's clinic facilities are the first approved by Saudi Aramco in the whole economic city zone, being appreciated for good organization and the implementation of Saudi Aramco requirements which resulted in getting the highest score to be given by Saudi Aramco: 95/100.

  The JRUP Project received a recognition letter from CCC's President (Engineering & Construction) Samer Khoury for this achievement.

- The JRUP Project used 120 solar lighting poles for camp lighting, which helped to have a less polluted environment and reduced gas emissions and fuel consumption.

2. Administration

- The JRUP Project played a leading role in applying centralization in Jazan projects. This experience led to a successful centralized administration for Jazan Projects (JRUP, JRTF and JSRU) providing different services to CCC staff and labour efficiently.

- The JRUP Project was the first project to apply a leading transportation procedure for project staff. None of the project staff (including the project management team) used a private car. Cars were provided by the Administration Transportation Officer, upon request, to all the staff.

  This leading procedure led to a remarkable reduction in the number of hired cars, which led to cost saving, besides improving the culture of resource sharing to make the maximum possible use of project resources.

- Graduates under Development: The JRUP Project has 13 GUDs. Each one of the GUDs has his own sponsor who supervises his rotation in different departments and provides him with coaching and guidance. All GUDs have been sent to different seminars and training courses.

- Tournaments and Activities: In memory of Said Khoury and Hasib Sabbagh, the JRUP Project organized a football tournament for the projects working in Jazan Economic City. In addition, the JRUP administration organized various tournaments and activities.

Solar Street Light Poles

Football Team

3. Corporate Social Responsibility

In line with CCC's Corporate Social Responsibility Initiative, to ensure that business values and behaviour are aligned to balance between improving and developing the company's business as well as improving the quality of life of its workforce, their families, local communities, and societies at large, the JRUP Project Team worked from day one to build a remarkable and solid relationship with the local community in different sectors:

- Government and public relations: The JRUP Project was granted two awards during a ceremony on the 31 March 2016 at the Emirate of Jazan for:
  - ↳ JRUP Saudi PRO who has good relations with the emirate of Jazan and governmental offices all over the different towns of Jazan.
  - ↳ The recruitment of 300 employees (at that date) in various disciplines from the surrounding towns of Jazan especially engineers noting that we are the company (project) within the Saudi Aramco area which has recruited the highest number of engineers. This is as per the statement of the governor of Jazan during his speech at the ceremony. Moreover, the tribute award is given for implementing the ethics and anti-corruption of CCC in all Jazan through its employees.
- Recruitment and Training: the JRUP Project recruited more than 800 Saudi employees in different categories - engineers, administrative and management positions, site leaders and supervisors, skilled and unskilled labourers. Training was provided for the majority of these employees as well as seminars and special courses.
- Procurement and subcontracting: the JRUP Project depends mainly on the local Saudi market for material procurement and subcontracting.

  Until now more than 20 major subcontracts have been awarded to different Saudi local companies. In addition, the Procurement Team developed good relations with more than 70 suppliers in the local market, providing the project with most of the required permanent material and consumables.
- PMV: the JRUP Project relies on the Saudi local market for project construction equipment (cranes, telehandlers, tipper trucks, excavators and so on) as well as buses, pick-ups and cars. More than 500 pieces of plant and equipment have been hired from more than 76 suppliers.
- Project Control: the JRUP Project uses CCC Project Control systems (Talisman, VBS, Projmon, Maximo, C3D, I-risk and so on). The IT Department also developed a lot of tools to facilitate the work and enhance efficiency. The implementation of these programmes helped to establish a very organized control system in the project.

  In addition, the JRUP Project succeeded in implementing a practical risk management policy helping the project management team to preview most of the main challenges and difficulties in the project and to be proactive about them.

The Current Situation & Future Challenges

The project will soon reach a progress percentage of 60%. The project team is aiming to continue the remaining period of the project with the best practices in order to achieve a successful project completion meeting client satisfaction and corporate objectives.

Samer Khoury with RH Prince Turkey Meeting Saudi Staff at the Jazan Projects

Sulfur Recovery & Soot Ash Removal Units

FEATURE

Introduction

Jazan is a city located in the southwestern part of the Kingdom of Saudi Arabia sharing a border with its neighbour, the Republic of Yemen. In 2014 and as part of the Economic City Project in Jazan, Saudi Aramco announced the construction of the Integrated Gasification Combined Cycle (IGCC) Refinery and Terminal. This economic city aims to make Jazan a commercial and industrial hub on the Red Sea and Horn of Africa by stimulating manufacturing and industry in the region.

CCC has been awarded several projects: the two we will be covering in this article are the Sulfur Recovery Unit (SRU) and Soot Ash Removal Unit (SARU). These are two components of the Jazan Integrated Gasification Combine Cycle (JIGCC), the largest gasifier-based power facility built in the world. JIGCC will supply power, steam and utilities to a 400,000 BPD Jazan Refinery at JEC and export power to the grid. CCC's scope of work consists of the construction and pre-commissioning of the projects.

SRU Award Date: *March 2015*
SARU Award Date: *April 2015*
Main Contractor: *SAIPEM*
Location: *Jazan Economic City*

Integrated Gasification Combined Cycle (IGCC)

This is a technology that uses gasification of solid and liquid fuels to remove impurities such as sulfur and mercury, producing an environment-friendly form of gas fuel called synthetic or synthesis gas (syngas), which also has the efficiency of a natural gas power plant and thermal performance of combined cycle.

In other words, it reduces the environmental impact of burning fuels and increases efficiency which reduces the cost of generating electricity when compared to directly combusting fuels. This is clearly shown in the diagram (Figure 1).

Sulfur Recovery Unit (SRU)

This is a typical unit using the Claus reaction to recover sulfur. It consists of a common area and three typical trains equal to 541 tons per day of sulfur recovery located within the refinery. The process is explained in Figure 2.

Soot Ash Removal Unit (SARU)

The SARU Project consists of a common area and four typical blocks with a capacity equal to 788 KG/Hr of ash recovery located within the refinery. It is considered to be the largest soot ash removal unit of its kind amongst those few existing in the world today.

SARU was developed in 1991 as a new, more environmentally friendly and economical method of soot/ash removal for gasification. The application of SARU makes the soot processing not only environmentally acceptable but also disconnects it from the mainstream of hydrogen and power generation, thus increasing the reliability of the overall process. It also avoids the build-up of ash in the gasifier feed, as is the case with recycling processes. This means that the refinery gets an

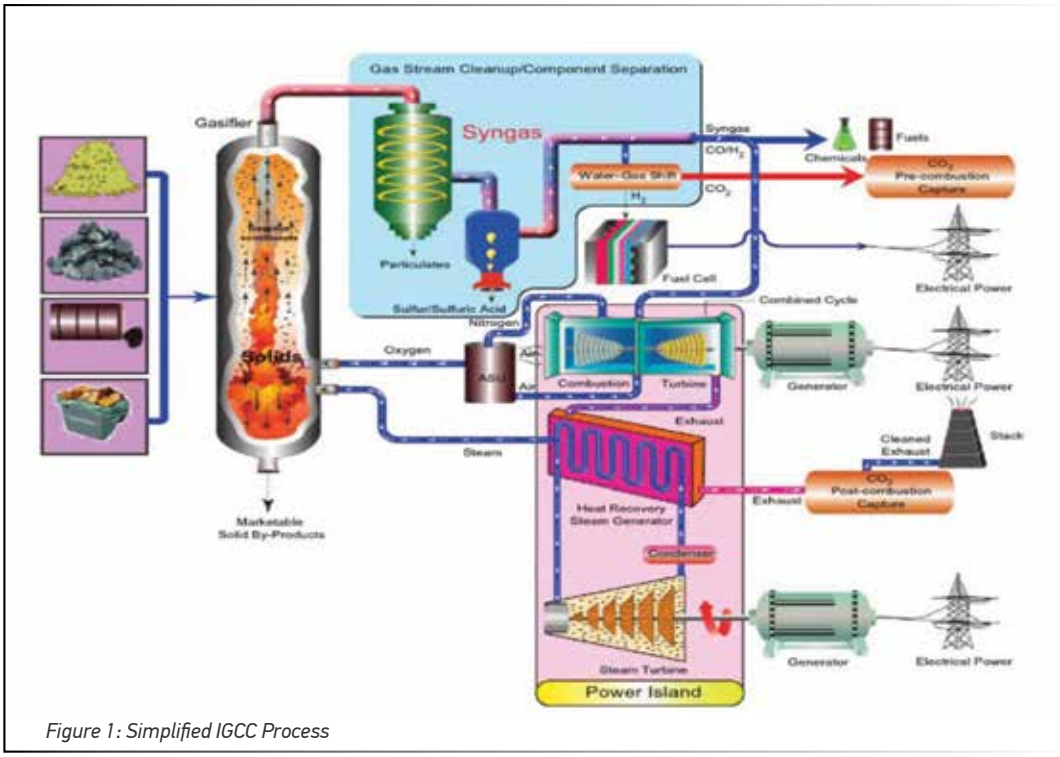


Figure 1: Simplified IGCC Process

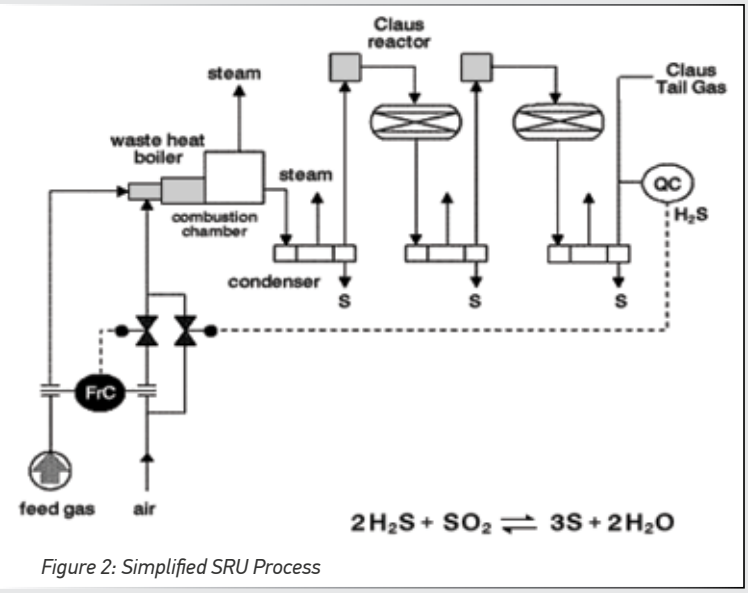


Figure 2: Simplified SRU Process

additional flexibility in its crude diet since any residue it produces can be processed. Since the SARU is not a recycling process that should be closely linked to gasification, it can be treated as a separate plant.

The soot formed in the partial oxidation reaction is removed from the system with the process condensate as soot slurry (1% wt. carbon on water) and is routed to the SARU. After soot removal the water is returned to the soot scrubbing section, the excess of water is routed to the waste water treatment section.

The soot and ash are filtered out of the slurry using an optimized filtration method producing a hard filter cake with about 20% weight solids and a clear water filtrate. Advanced process controls are in place to handle the transitions between continuous gasification process and discontinuous filtration. This system can also handle about three hours' disruption of filter press operation.

Figure 3: Filter Press

This filtering process is achieved via four filter press units installed in each of the four blocks (16 in total in the SARU plant). A filter press unit is a horizontal machine, designed to meet the customer's requests for 24 hours fully automated operation in the production process of various industries.

The main features of the filter press include:

- Full Automatic Operation: Perfect Cake Discharge.
- High Production Capacity.
- Efficient Performance.
- Superior High Dryness Dewatering Performance.

The filter cake is subjected to controlled oxidation in a Multiple Hearth Furnace (MHF). This furnace yields metals oxides ash with a minimum of residual soot and thus high metal concentrations, (vanadium oxide typically around 65%). The ash is a marketable product and not a waste material.

Utmost care is taken with the handling of this ash, because of the toxicity of the vanadium and nickel oxides.

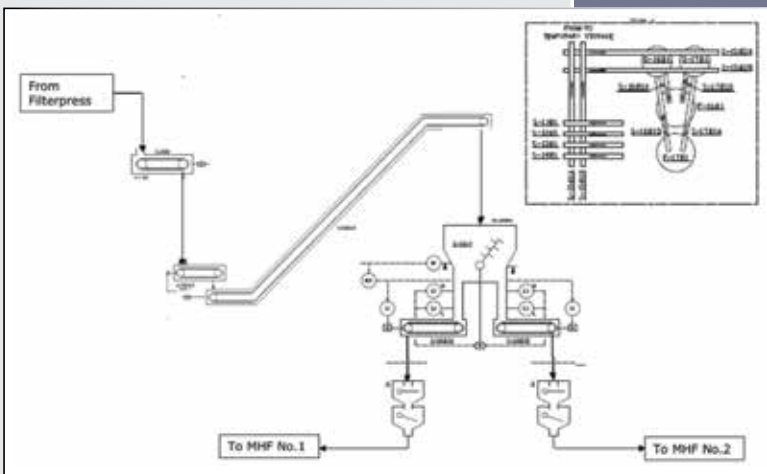


Figure 4: Filter Cake Production

There are eight MHF units in SARU. Each weighs around 1,200 metric ton, including steel and refractory weights.

An MHF is used for the continuous preparation of materials. It consists of several circular hearths superimposed on each other. Material is fed from the top and is moved by the action of rotating "rabble arms" and the revolving mechanical rabbles attached to the arms move over the surface of each hearth to continuously shift the ore. The arms are attached to a rotating central shaft that passes through the centre of the

Figure 5: Multiple Hearth Furnace

roaster. As the material is moved, the ore that is charged at the top hearth gradually moves downward as it passes through windows on the floor of each hearth or through alternate passages around the shaft and the periphery until it finally emerges at the bottom. The oxidizing gases flow upward i.e. countercurrent to the descending charge. In a well-insulated roaster, external heating is unnecessary except when the charge is highly moist. The hearth at the top of the roaster dries and heats the charge. Ignition and oxidation of the charge occur lower down.

The hearths may be individually heated and the number, temperature, rotation rate and size of each hearth determines the residence time and conditions for the calcining powder in order to achieve the desired final properties. The

Figure 6: Hearth Refractory Installation

individual hearths are lined with refractory brick and the rabble arms are typically a force cooled metal alloy. The entire structure is enclosed in a cylindrical brick-lined steel shell.

Off gases from the combustion (MHF) pass through dust removal equipment called the Bag filter. In this way, the SARU complies fully with the environmental constraints set by authorities in the permit to operate the refinery.

There are eight bag filter units in SARU. Each bag filter is composed of:

- Hooper
- Casing
- Plenum.

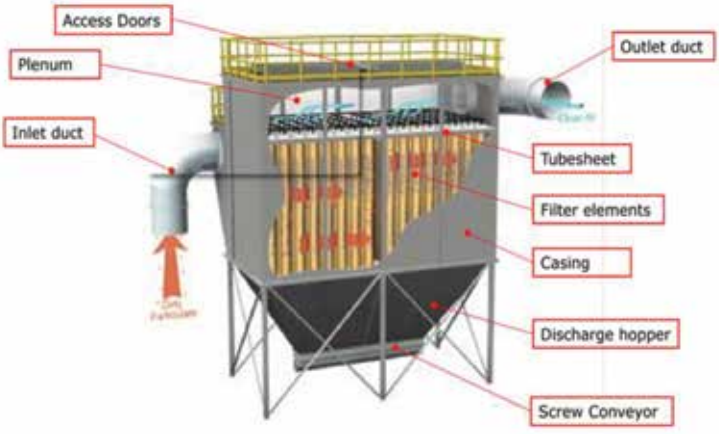


Figure 7: Bag Filter

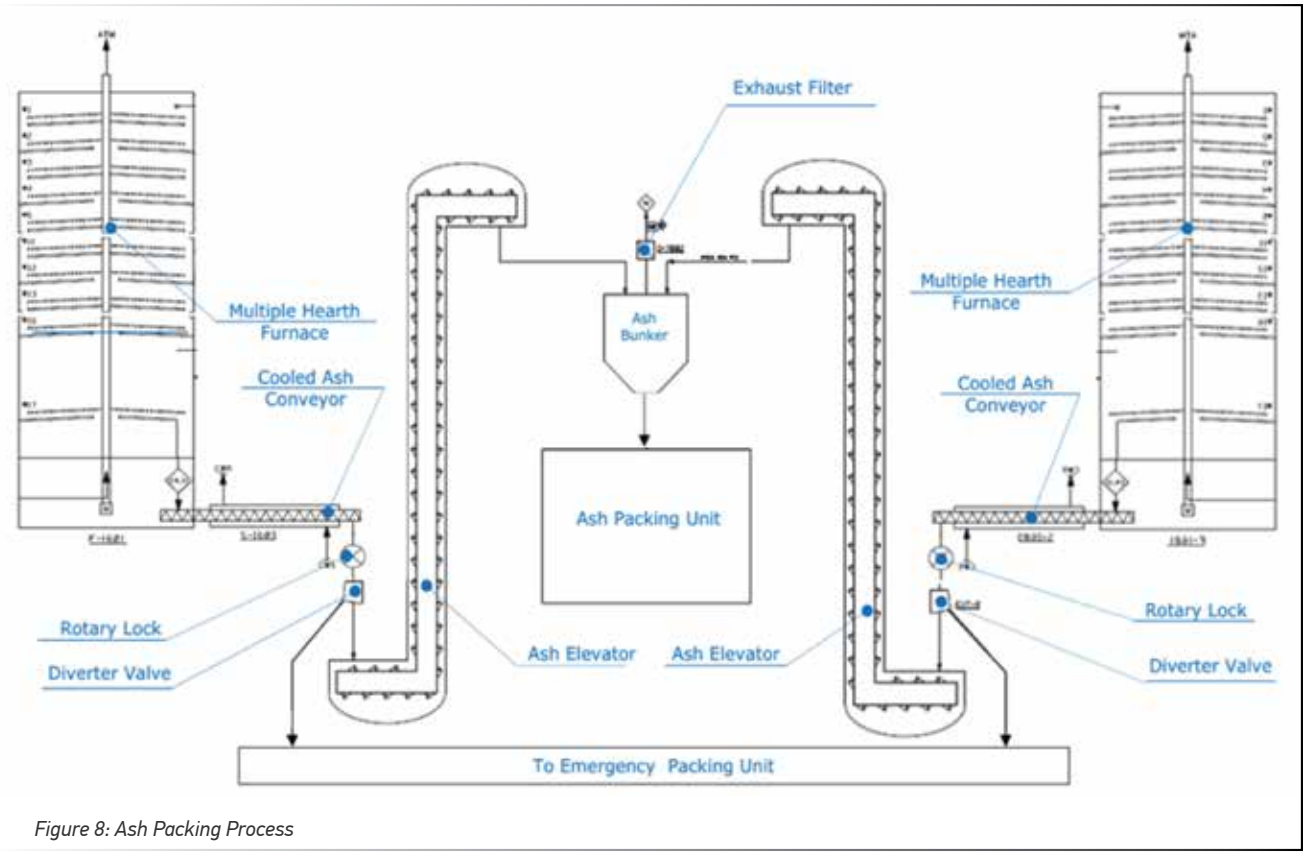


Figure 8: Ash Packing Process

The flue gas leaving the Multiple Hearth Furnace contains dust, carbon monoxide and trace impurities, which originate from the cake; in particular SO2, HCN, HCOOH, HCl and NH3. The flue gas is mixed and quenched with ambient air (provided by quench air fan) to a temperature of 210 C. The cyclone, installed upstream the bag filter, roughly removes 80% of the waste (including the still glowing larger particle) in the burned gases under high pressure and temperature and the remaining 20% will be filtered in the bag filter.

The bag filter will filter the ash coming from the furnace and the bag filter output will be clean air blown into the atmosphere. The filtrate/ residue will be drawn back to the furnace via the conveyer system where it will continue burning. Once the burning process is completed in the MHF the soot ash is collected at the bottom of the MHF and transferred via a screw conveyer system to the ash packing unit. The ash packing unit through the ash bunker will inject the ash into industrial bags. These bags are then transferred to be stored in the bag storage area to later be sold in the market.

M.A.H. AL SAYED

Jazan Refinery Tank Farm Project

Package 4 & 5

When the JRTF Project is mentioned within the company, the first thing that springs to mind is the project's tarnished reputation and the tremendous delays experienced. In fact, people are unaware of the mammoth challenges and difficulties facing the project team. These issues, to mention a few, are illustrated hereunder.

The project is located in an urban area still under development with a footprint +/- 12 km2, which fundamentally means utilization of enormous resources, such as labour and facilities.

There are 90 tanks in the North Tank Farm (NTF) being constructed by Hidada (a Saudi local contractor). These are inside dike wall areas, not yet released to CCC for construction of its own activities. This constitutes approximately 30% of the project scope encompassing civil, piping and E&I disciplines.

Notwithstanding the fact that after a delayed start of 14 months and a further 30 months into the project, the main contractor Petrofac Saudi Arabia Limited (PSAL) has yet to finalize the design of the project. This has introduced an interrupted supply of work fronts, IFC drawings, Free Issue Materials, Field Change Designs, and Technical Queries, causing out of sequence constructability and lowered productivity and progress.

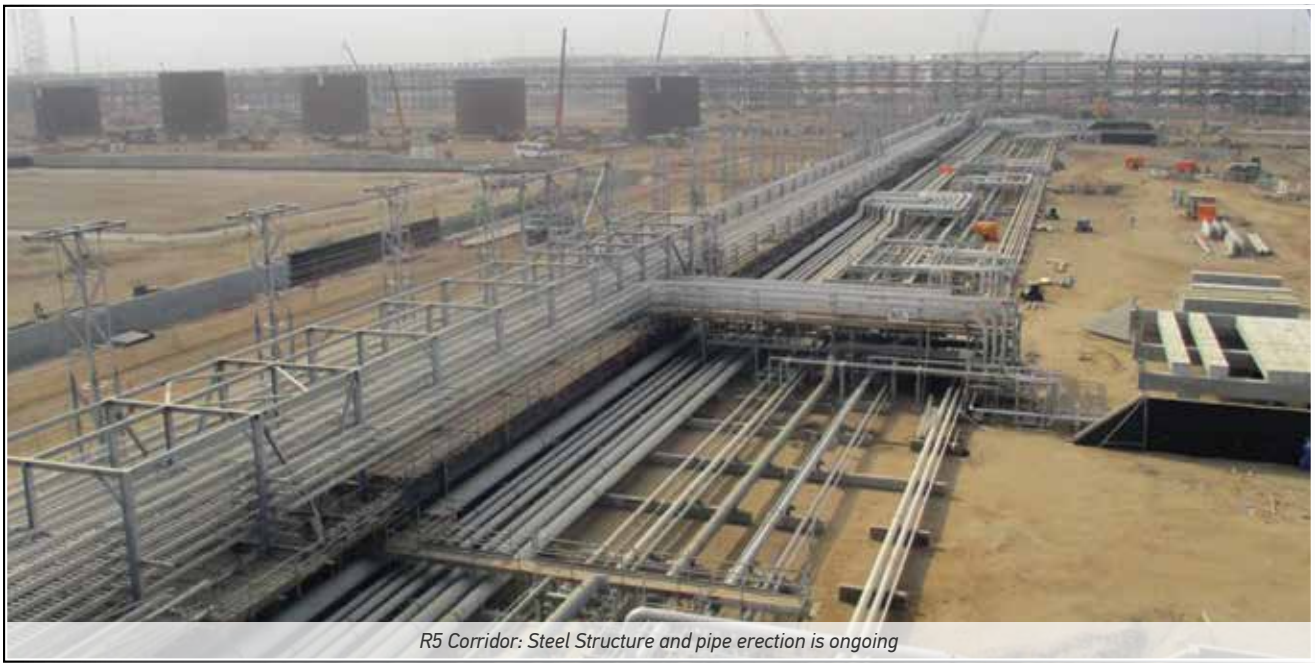
There are more than 68,000 foundations and 400 road crossing duct banks, which hinder detailing and sequencing. In addition, the designs of foundations are not standardized and are in a great variety of shapes and sizes. Over and above this, they are being adapted in the field, due to clashes with other services in the design and they vary in excavation depths, exacerbating the construction difficulties.

Over 75% of civil foundation drawings were received during 2016, affecting the overall project schedule, let alone the activities following it, such as structural steel, piping, pipe supports and cable trays and so on. Cable tray scope increased from 16,482 LM to 298,197 LM and this increased cable quantities accordingly.

PSAL's engineering prospective focus was on saving on concrete quantities, rather than practicality and speed of erection. This noted, the civil project team remains focused on achieving and maintaining a steady concrete progress of 2000 m3 / week.

Delays in designs involve delay in Free Issue Material delivery to site, especially piping material. Piping scope has increased by over 35% and reached 1.6 Million Inch Dia and still furthermore hampered by 58% isometrics revisions to date. PSAL's engineers don't highlight or cloud revision locations in drawings and that burdens the RASO detailing team. However, they were able to provide steady detailing feed. Our fabrication shop, with all of these challenges, was able to produce 10,500 ID/ week and field erection is achieving 10,000 ID / week.

All commodities provided by PSAL such as structure steel delivery, are trailing by about six months: out of 1,400 modules which equal



R5 Corridor: Steel Structure and pipe erection is ongoing

Jazan Refinery Tank Farm Project - Package 4 & 5

Metering and prover skid erection is completed

Irregular Foundation Shapes

18,000-ton total required, 5,000 tons are still to be delivered. Likewise, all deliveries are also out of sequence, resulting in additional teams assigned in lay down yards for segregating and packaging steel members to facilitate logistics and tagging issues and so on. Most equipment to be supplied is also outstanding.

Cable schedules were only partially received in early March this year and cable installation commenced on 15 March 2017. This achievement is seen as a momentous breakthrough on the project. It is also to be noted that the increased quantities of cables started at 4,500 km and currently estimated at 6,500 km.

Despite all these difficult challenges, the JRTF team is mitigating these obstacles through inter-departmental coordination, mobilization of additional equipment such as cranes, generators, excavators and tipper trucks and so on. There is also an injection of additional resources, increased working hours and double shifts for continuity of work. Subcontractors are also engaged for full integration of work load and progress achievement.

The project is also focused on meeting company commitments by integrating locals and mentoring young graduates and engineers, by exposing them to field experience and future career development in CCC.

Frequent visits by executive management are certainly an advantage and a show of support to maintain the motivation of the project team and also assist with client matters.

Multi Level Foundations

The Batinah Expressway Project, Oman: Paving the Way

Project Scope

The Batinah Expressway is a major undertaking by the Ministry of Transportation to reduce the travel time of people and freight traveling along the Batinah Highway in Oman. It extends from Muscat towards Khatmat Milahah, near the north border with UAE. It is 266km long and split into six packages. CCC was awarded the construction of Package 6 which comprises 45km of dual four-lane road and 36km of slips, loops and link roads, four interchanges, four wadi bridges, two flyovers, three underpasses and 153 multi-cell culverts.

What Makes this Project so Special

By definition every project is unique yet not every project is special. What makes this project so special is the fact that it was the last of six packages awarded for construction; however CCC managed to complete the project in advance and even open sections of the expressway to the public during construction.

This achievement, for sure, was the result of the management style and leadership as well as the teamwork and cooperation between project members. To explain, the management met the project members on a weekly basis to directly communicate information and listen to their ideas and comments ensuring a transparent work environment. Daily interactions were also encouraged with an 'open door' policy.

In addition, the management was very keen to adopt new approaches and technology and led the way in incorporating them into the project's operations. Some of these new ideas are presented in the following sections.

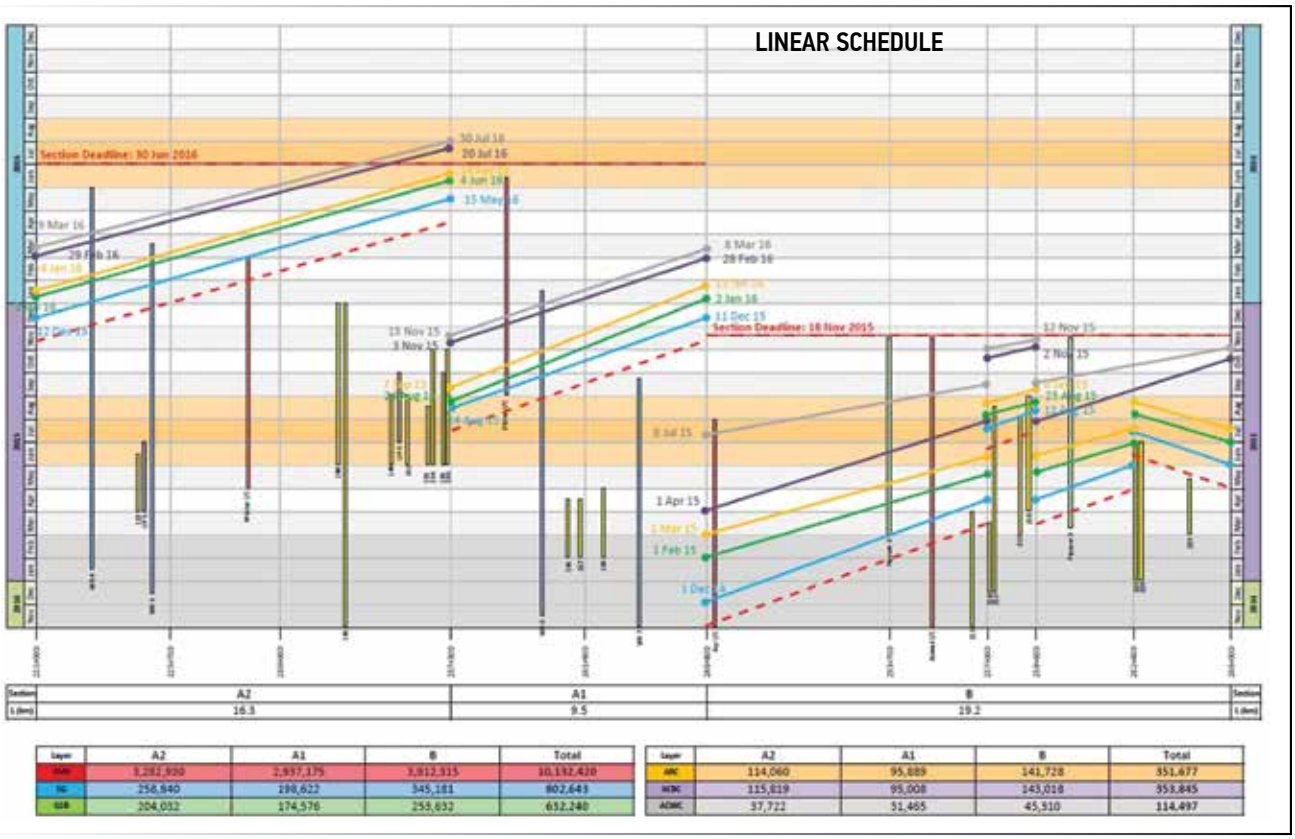
Project Strategy and Planning

The project was divided into several sections and a sample section (around 5km) was selected to be completed first. This section allowed the project team to commence all activities and achieve the learning curve as early as possible. Also, it helped in measuring the actual time for each operation and then forecast the needed time and resources to finish the project on time.

Another cornerstone in the planning and execution of the project was the linear schedule (also known as 'a sloping bar chart'). The use of this linear schedule allowed the construction team to:

- Ensure that open fronts were always present.
- Foresee any potential clashes between earthworks, layer works and structures.
- Follow the movement of equipment and make sure that no crew was kept idle.
- Determine the production rates and the number of required crushers and asphalt plants.
- Optimize the operational costs of the crews for earthworks and layer works, and

Aqr Interchange



Layer	A2	A1	B	Total
[illegible]	3,282,930	2,937,175	3,912,315	10,132,420
[illegible]	258,840	198,622	345,181	802,643
[illegible]	204,032	174,576	253,632	632,240

Layer	A2	A1	B	Total
ARC	114,060	95,889	141,728	351,677
ACBC	115,819	95,008	143,018	353,845
ACWC	37,722	31,465	45,310	114,497

- Forecast peak time and make sure that resources were available when needed.

Drones

One of the recent technological advancements in the construction industry is the use of unmanned aerial vehicles (UAVs) commonly known as drones. The project team used a drone to:

- Capture high quality progress photos and videos.
- Effectively plan for traffic diversions.
- Plan the hauling of earthwork material.
- Better manage the drainage of runoff water.
- Check the safety of bridge scaffolding and high level areas, and
- Make sure that the wadis were clear of resources ahead of a potential flooding event.

Throughout the project, the drone proved to be very useful and helped in marketing the achievements of CCC to the client. In addition, the project team assisted other CCC projects in Oman (ATD, AWP and FQI) to make use of the drone as well as uploading pictures to the project website: http://batinahewp6.wix.com/bew-p6

Aswad Interchange

Checking Safety of High Level Areas

Asphalt Feeder

Another recent trend in construction, specifically asphalt pavement construction, is the use of a material transfer vehicle (MTV) also known as an asphalt feeder or a shuttle buggy. The asphalt feeder can greatly enhance the paving operation as it:

- Helps in material mixing and prevents thermal segregation and asphalt lumps.
- Increases pavement life and eradicates premature failure.
- Reduces the transverse joints and results in asphalt with better rideability/smoothness.
- Reduces the waiting time and number of hauling trucks.
- Allows feeding two pavers, offset paving and better maneuverability, and
- Helps in increasing the efficiency of asphalt plants.

International Roughness Index (IRI) - New Approach

IRI is the measure of the ride quality of concrete and asphalt pavements and is reported in m/km (meter per kilometer). The normal procedure with the IRI test is to carry it out on the wearing course (final road layer). In case any section should exceed the threshold set by specifications, a sliding scale deduction will be levied against CCC's account for the nonconforming section. If ride quality is assessed as particularly bumpy, the section has to be rectified and this for sure entails the cost of rework.

In order to be proactive, the management approached the test differently and tested the underlying layer (asphalt base course). Consequently, whenever increased readings were detected, extra attention was given in paving the wearing course at this section. In general, the results for the wearing course were spotless and

Asphalt Feeder - First Stretch

IRI machine mounted on CCC Pickup

Oman National Day

Camera and GPS for IRI Test

Certificate of Appreciation

a high risk was avoided by taking this preventive action.

The management of the project decided to buy the IRI testing machine in order to use it anytime and to avoid having to hire subcontractors that generally use older style equipment and charge per length tested.

Conclusion

It is important to realize that the Batinah Expressway Project, like any other CCC project, adhered to corporate policies and procedures in different areas e.g. safety, quality, management, operations, CSR and so on. However, the project management and team were willing to go the extra mile and explore new areas in the management and construction of road projects.

Moreover, the project team was devoted to taking good care of the labourers and their welfare and treated them like members of the project family. Good performers at work and safe performers were given awards and incentives. As a result, the labourers were motivated to do extra work, safely and beat the norms of work. Also, the project team was attentive to the local community and offered their help and services whenever needed. The number of appreciation certificates that the team received is an affirmation of their commitment to CSR.

All the initiatives mentioned (and many others not mentioned) made Batinah Expressway Project a pioneer project that has contributed to introducing new ways of doing things and added another landmark to CCC and the Oman Area portfolio. Eventually, knowledge is meant to be shared with others to allow further improvement and ultimately setting best practices for CCC and the way we do business.

Part of BEW Project Team

Said Khoury & Hasib Sabbagh Hall

Kazakhstan

Consolidated Contractors Engineering & Procurement S.A.L. Offshore (CCEP) has been active in the Republic of Kazakhstan since 1998, with participation in the construction of the Kashagan, Karashaganak and Karabatan fields, as well as currently in the Future Growth Project in Tengiz and the Abu Dhabi Plaza in Astana. The contribution of the local societies in performing such complex and critical projects is significant, and in order to show its appreciation, CCEP opened the Hasib Sabbagh & Said Khoury Lecture Hall of KazGUU University in Astana and the CCEP Vocational Training Centre in Atyrau.

Inauguration of the Hasib Sabbagh & Said Khoury Lecture Hall of KazGUU University, Astana, Kazakhstan

On the 27 February 2017, Mr. Samer Said Khoury inaugurated the KazGUU University's lecture hall named after his late father and his late uncle Mr. Said Khoury and Mr. Hasib Sabbagh respectively.

CCEP would like to take this opportunity and show its appreciation to the Ambassador of Palestine Dr. Montaser Abu-Zaid, the initiator of the Hasib Sabbagh & Said Khoury Lecture Hall Project for his invaluable hard work and support.

The inauguration was attended by the Arab Ambassadors / Heads of Diplomatic Missions in Astana, Kazakhstan, CCEP's Astana Staff and the professors and students of KazGUU University.

The ceremony was opened with an introductory speech from the Director of the Institute of Postgraduate Education and International Relations in KAZGUU University Ms. Renata Faizova, who showed her appreciation to CCEP. Ms. Faizova's speech was followed by a speech from the Ambassador of Palestine, Dr. Montaser Abu-Zaid, who emphasized the importance of education and its impact on the future generations of Kazakhstan.

Furthermore, Mr. Samer Said Khoury, in his speech, congratulated the KazGUU University for its success and exceptionality, as it is the only University in Kazakhstan which has unconditionally obtained international accreditation and successfully established partnership with a number of universities in Russia, USA, Japan, Korea and Europe. Additionally, Mr. Khoury also congratulated those who work for and supervise this great institution and acknowledged that CCEP's core values coincide with KazGUU University's purpose and goals.

Mr. Khoury's speech was followed by those of the Ambassador of Lebanon Mr. Vasken Kavlakian and the Chairman of the Board Candidate of Law Sciences Mr. Narikbayev Talgat Maksutovich, who closed the inauguration with an appreciation to CCEP, acknowledging its support, values and

Opening Ceremony Said Khoury & Hasib Sabbagh Hall

achievements in the Republic of Kazakhstan.

KazGUU University awarded Mr. Samer Said Khoury with the title of Honorary Doctor of KazGUU University.

We would like to take this opportunity and extend our appreciation to His Excellency Dr. Montaser Abu-Zaid the Ambassador of Palestine to Kazakhstan, Ms. Renata Faizova Director

of the Institute of postgraduate education and international relations in KAZGUU University, Mr. Ghazi Anouti and Mr. Samer Haddad for taking the time and effort in ensuring the successful delivery of the lecture hall. Their invaluable guidance and insights were a tremendous help to us during this task.

Kazakhstan

CCEP Vocational Training Centre, Atyrau

On the 28 February 2017, Consolidated Contracting Engineering & Procurement S.A.L Offshore (CCEP), Kazakhstan proudly opened its first Vocational Training Centre in Atyrau, Kazakhstan.

The Vocational Training Centre is supported by the Management of Educational Establishments "APEC Petrotechnic" and will provide training to people who wish to become electricians, welders, carpenters, scaffolders and process pipe fitters.

The opening ceremony was inaugurated by Mr. Samer Khoury and the honorable attendees Mr. Nazih Abdul Khader, Mr. Hisham Kawash, Mr. Nakpaive - Deputy Akim of Atyrau Region, Mr. Erkin Shpanov - Head of labor department for Atyrau Region, Mr. Bakbirgen Karabaev - Deputy Head of Nur Otan Party, the Management of Tengizchevroil (TCO) and the Future Growth Project (FGP).

The Deputy Akim of Atyrau Region, Mr. Nakpaive and the Deputy Head of Nur Otan Party, Mr. Bakbirgen expressed their gratitude to CCEP for investing in to the new generation of Kazakhstan and making this Vocational Training Center a reality.

Young people who want to enter the construction industry will now have the opportunity to obtain the specialty of their choice, giving them a significant competitive advantage. Additionally, the Training Centre will also provide professional development to CCC's current employees.

The above mentioned project demonstrates that CCEP proudly stands true to its core values by giving to society and providing opportunities to build a better future.

"There is no exercise better for the heart than reaching down and lifting people up."

John Holmes

O. EL JERBI

The Inauguration of the State-of-the-Art Laffan Refinery 2

Qatar

Monday, 20 February 2017 marked the celebration and opening ceremony of the $1.5 billion investment and the aptly named state-of-the-art Laffan Refinery 2 (LR2).

Whilst declaring the importance and the strategic role of the refinery towards implementing Qatar Vision 2030, H H the Emir Sheikh Tamim bin Hamad Al-Thani inaugurated Laffan Refinery 2 in the ceremony which was held at the Qatar National Convention Centre, under the slogan "Energy-Enrich our Future".

With the effective start date being 15 July 2013, the general construction work including the EPC of buildings for the refinery was awarded to Consolidated Contractors Group S.A.L. (Offshore) (CCC) by the joint venture (CCJV) of Chiyoda, and CTCI being the main contractor for the EPSCC contract of Laffan Refinery 2 Project.

The very ambitious design of the 146,000 barrels per day of condensate refinery adheres to the highest environmental standards through low gas emissions, zero flaring during normal operation and zero waste and discharge into the sea. On top of that and without any compromise of sustained environmental standards, the refinery using the North Field condensate, produces five high quality products, namely naphtha, kerojet (A-1), diesel and liquefied petroleum gas in the form of propane and butane. These products gave birth to new economic prospects through the enhancement of exporting capacity as well as the ability to supply international demand for energy.

LR2 is operated by Qatargas on behalf of shareholders: Qatar Petroleum (84%), Total (10%), Cosmo (2%), Idemitsu (2%), Mitsui (1%) and Marubeni (1%). The strategic refinery processing capacity of 146,000 barrels per day has doubled Qatar's capability to refine condensates and effectively renders Qatar one of the largest condensate refiners in the world.

CCC's successful completion of the works in conjunction with parties and stakeholders of the project paved the road to Qatargas' announcement of the commercial startup of Laffan Refinery 2 on 24 December 2016 and completion within the planned 39 months. Throughout the path to such success, Qatargas expressed its appreciation of CCC's endeavours and contribution on several occasions. Such appreciation was further enhanced by inviting CCC's representatives to attend and jointly celebrate the inauguration ceremony (see photo).

Information on the Laffan Refinery 2 project, key achievements, lessons learnt, article and contributions, and progress tracking can be found on the Project Profile on Fanous.

From left to right: Saji Khoury, Mustafa Younis, Nazih Abdul Kader, Samer Khoury, Suheil Sabbagh, Oussama El Jerbi, Basil Khoury.

CNBC Article on Bethlehem Development

Palestine

In a recent article which appeared in the on-line Consumer News & Business Channel, writer Elizabeth MacBride referred to our President (Engineering & Construction), Samer Khoury as "the Billionaire who is Saving Bethlehem". See some extracts from the article below whilst the full article can be found at: http://www.cnbc.com/id/104297590.

Samer Khoury is not a diplomat, which makes his self-assigned mission of restoring the little town of Bethlehem that much harder. Despite incredible odds, this businessman has been able to attract the support from heavyweight patrons of all faiths, including Theodore McCarrick, the archbishop emeritus of Washington, D.C.; Prince Talal Bin Abdulaziz Al Saud, a senior member of the royal family of Saudi Arabia; and, more controversially, Sheikh Muhammad A. Hussein, the grand mufti of Jerusalem, the Sunni Muslim in charge of the Al-Aqsa Mosque.

The task requires a tenacious spirit. On one hand, the unassuming Athens-based construction magnate, one of the family that owns the $5.3 billion Consolidated Contractors Company, is dealing with the Israeli occupational government, which has a say in much of what happens in Bethlehem. The Palestinian city lies just beyond the wall that separates Israel and Palestine, in between Jerusalem and the Jordan River.

Khoury also has to cope with Palestinian politics, which are in a perpetual state of disarray depending on support - or the lack of it - from the international community.

The long conflict and military occupation have exacted a heavy toll on Bethlehem, which could otherwise be one of the most visited tourism destinations in the world. The GDP per capita in the West Bank and Gaza is $4,300. Bethlehem remains a poor city, where some families live in one-room homes and many young people lack jobs.

Recently U.S. President Donald Trump signaled he was backing away from the U.S. commitment to a Palestinian state, as he rebuked Israel for its continual appropriation of Palestinian land in the West Bank. Many observers took Trump's moves - which have knocked both sides and neighboring Jordan off balance - as a sign he intends to reopen peace negotiations.

A Political Morass

Fractured politics mirror the fractured religions: The main attraction in Bethlehem is the Church of the Nativity, said to be the birthplace of Christ. It has been governed for centuries by three denominations whose defense of their "zones" in the church is legendary and has sometimes come to blows: the Franciscan order of Roman Catholics, the Greek Orthodox Church and Armenian Apostolic Church.

"They are not businesspeople," said Khoury, sounding pained, recounting the difficulties of getting the lights strung to decorate the Church at Christmas.

But, moved by his family's Greek Orthodox and Palestinian roots, Khoury has a new vision for Bethlehem: Within 10 years, he wants to see 3 million tourists a year thronging the narrow streets. Three years in, he said, "We're 5 percent to 10 percent there."

Paying it forward

Khoury's late father, Said, founded the Bethlehem Development Foundation, a nonprofit that has so far spent $30 million. It aims to raise and spend another $70 million by 2027. "It's a sad city when you enter," Said Khoury. "This is the center of Christianity, important for 2 billion people. My father said: 'It is going to be a ghetto if nobody does anything.'"

Khoury, who picked up the reigns after his father died in 2014, wants to do everything to spur tourism, including building a new hotel.

L. ISTAMBOULI

Naugatuck Valley Community College Opening

Morganti

USA

19 January 2017, Waterbury, Connecticut: the opening of the Naugatuck Valley Community College's new Founders Hall Center for Health Sciences completes nine years of planning and two years of demolition/construction. Morganti is happy to be a part of such a beneficial addition to the school, and we look forward to seeing where it takes their students!

Doing Business in the Arab World Workshop

Greece

The following is the official press release issued at the end of this event:

It is with great success that the Arab-Hellenic Chamber of Commerce and Development concluded on Wednesday, 22 March 2017 the Workshop "Doing Business in the Arab World" at the Divani Caravel Hotel in Athens. The event was attended by Arab Ambassadors, Greek officials and representatives of commercial organizations, more than 50 Arab business owners and CEO's from seven countries, Egypt, Erbil-Iraq, Jordan, Lebanon, Libya, the United Arab Emirates and Palestine and more than 190 Greek businessmen representing around 135 Greek companies in various sectors.

The opening speech was delivered by Mr. Rashad Mabger, Secretary General of the Arab-Hellenic Chamber, Mr. Harris Geronikolas, Chairman of the Board and H.E. Mr. Marwan Emile Toubassi, Dean of the Council of Arab Ambassadors in Greece, Ambassador of the State of Palestine. Dr. Saleh Jallad represented Mr. Tawfic S. Khoury, Executive Vice Chairman, CCC, as keynote speaker, and then our guest of honor, H.E. Prof. George Katrougalos, Alternate Minister of Foreign Affairs in Greece, welcomed the esteemed attendees and referred to the potential investment and business relations between Greece and the Arab World.

The first session tackled the Culture of Business and Doing Business in the Arab World, with CCC's Financial Advisor as the Moderator, presenting the Ambassadors of Algeria and Egypt in Greece. In their speeches, they touched upon the aspects of doing business in their countries and the opportunities they provide as two of the most attractive destinations in the MENA region. Then, representatives of two of our oldest member-companies, CCC and Archirodon, narrated their success stories and history of doing business in the Arab world.

In the second session, the moderator was the Executive Director Overseas Business, from TERNA Company. It started with Ajman Free Zone of the United Arab Emirates, which was presented for first time to our audience as one of the most attractive hubs for establishing businesses in the whole of the Middle East. Afterwards, four Greek Counsellors on Economic and Commercial Affairs from the Greek Embassies accredited to Egypt, Iraq, the United Arab Emirates and Saudi Arabia (covering Oman and Yemen) communicated to our participants their unique experience in business practices and procedures in the Arab World, based on their years of residence in the said countries.

Following the two sessions, B2B meetings took place between the Greek and Arab businessmen. For the first time, a team of CCC Senior Engineers of various disciplines met with potential Greek companies in the Construction and Building Material sectors for pre-qualifications for CCC projects worldwide. During the B2B meetings, the Greek Commercial Attaches met with interested Greek companies in order to provide

Doing Business in the Arab World Workshop

useful information on the countries they represented.

The Arab-Hellenic Chamber seizes this opportunity to express its gratitude to the Ministry of Foreign Affairs and the Greek Embassies accredited to the Arab Countries for their valuable and continuous support. A word of thank goes to our Main Sponsor, CCC, the Silver Sponsor, Archirodon N.V., and to all our supporters and the media and communication sponsors. We, at the Arab-Hellenic Chamber, pride ourselves in the success of this important event and we are fully committed to continue on the same path of providing our level-best of services and assistance to our members and the business communities in the Arab world and Greece.

CORPORATE SOCIAL RESPONSIBILITY

Contribution to CSR Initiative

CCC Staff are encouraged to come up with ideas and activities related to CCC's CSR Initiatives including **Going Green** and community involvement events. Please send your ideas, initiatives and achievements to "CSR-CCC" email address csr@ccc.gr.

Greece

Visit to Eugenides Digital Planetarium in Athens

The Athens CSR Committee organized an event for CCC families at the Digital Planetarium of the Eugenides Foundation in February. The planetarium is one of the largest and most advanced digital 3D star simulator planetariums in the world. 120 participants had the opportunity to participate in two shows, "Fly me to the Moon" which was for children 5 years and above and "Mysteries of the Unseen World", for children 10 years and above.

"Friends of the Child" Nursery

The latest theatrical activities the "Friends of the Child" Nursery participated in (end of 2016):

- A puppet show.
- An experiential activity on Christmas traditions.
- A theatrical game based on the Snow Queen.

Sikiarideio In Kind Donation

In January, the Athens CSR Committee organized an in kind donation to the Sikiaridio Foundation, an organization for mentally handicapped children. CCC donated dry food like rice, pasta, sugar, condensed milk as well as cleaning materials.

UAE

APM HH Environmental Award 2016

Automated People Mover Head House Project at the New Abu Dhabi Airport Extension project has been awarded a certificate of appreciation from Abu Dhabi Airport Management (ADAC) for its top performance in the 2016 Environmental Compliance Audit in the 100,000 and above man-hours per month category and for promoting Environmental best practices at site among 16 other contractors in the Midfield Terminal Complex project.

UAE

Labour Run - 2016

"Our labourers are our heroes, Run....So They Can Run'' was a programme organized by Dubai Athletic Federation as part of Dubai's several other initiatives to invigorate the blue collar workers working in Dubai. Hundreds of workers representing major companies operating in Dubai participated in this labour marathon, involving both men and women. The run started at 7am and participants assembled in the grounds by 6.30am. Workers' enthusiasm to participate in such activities was evident as several workers living in CCC-Jabel Ali Camp woke up early morning, travelled 45 minutes to reach the assembly point on time, though the day of the event (Friday) was their valuable rest day. All participants completed the 5km distance and won completion medals.

Martyr's Day - Habshan and Hameem Camps

In the year 2006 the UAE declared 30 November as Martyr's Day, to commemorate and recognize the sacrifices and dedication of Emirati martyrs, who have given their lives in the UAE and abroad in the field of civil, military and humanitarian

services: a day to remember and honour those who have given their lives for the country. The authorities requested communities living in UAE to observe a one minute's silence and prayer from 11.30am to 11.31am on 30 November, followed by the hoisting of the UAE flag. UAE camp management and workers enthusiastically participated in the dignified commemorative events by assembling in front of the camp offices at 11.30am and observing silent prayer. The programme was organized by the camp management to demonstrate CCC's loyalty to the national sentiments and respect to the community in which we live.

USA - Morganti

Subcontractor Outreach - West Palm Beach, Florida

The South Florida office held a subcontractor outreach event at Broward County Public Schools' Blanche Ely HS. Thanks especially to our team of Jon Lowke and John Smith, and our partner, Cooper Construction Management, the event was a huge success.

CSR Volunteers

We are pleased to acknowledge the participation and continued support of volunteers towards CSR Initiatives in their respective areas during the First Quarter of 2017.

KUWAIT

Karim Al Ashkar

I joined CCC in 2015. Currently I am working in the Field Engineering Department at Clean Fuels Project in Kuwait. I am thrilled to have been selected "CSR Volunteer of the Quarter".

As a Graduate under Development (GUD) I am enthusiastic about spreading the mission of the CCC CSR team. Our main goal for 2016 was to implement the waste water treatment project for Reyah camp where currently all watering activities are done using treated sewage/laundry water. The process was executed using a highly advanced technique known as "electrocoagulation" advised by the CSR team as it is the most energy efficient and environmentally friendly water treatment.

Prior to joining CCC in 2015, I was an active member in one of the top pioneering national hunger relief initiative groups in Lebanon (the Food-blessed Group). Our main goal was to fight food poverty in Lebanon. As hunger-heroes, we used to rescue edible food that would have been thrown away from catering events, restaurants and shops, and redistribute it to those in need. I am looking forward to initiating similar Corporate Social Responsibility activities with my fellow CSR team members and colleagues at CCC.

William Moujaes

Corporate Social Responsibility (CSR) is an important value in today's business world. It allows us to display human qualities such as love, respect, care and generosity.

Back in my university days at the American University of Beirut, I was President of Engineers without Borders, an NGO which values CSR deeply. One of our major achievements was installing more than 100 solar panels for Asile Elderly Shelter and Sesobelle (both of which are charities). More than 200 students participated in this event, and long lasting friendships were formed between the participants and the beneficiaries. The sense of pride the participants felt after this event was so great it overweighs any job promotion or alternative success.

At our Lower Fars Heavy Oil Development Project in Kuwait, we are already showing CSR by doing our best to save the environment. To the surprise of the locals and our client, CCC's camp and site offices are heavily planted with trees and grass. To ensure these plants remain green we are watering them using our own waste water. Sewage produced from the camp is being treated and is reused in watering the green areas. By making the desert green, CCC proves that the welfare of the people and the area are a big priority. Who knows maybe one day we can provide some neighbouring farmers our treated waste water and support them in growing their crops.

G. MOUZAKITIS

Day Trip to Acrocorinth & Lake Doxa

Not far from the bustling city of Athens, Greece, wonderful historical, archaeological and nature attractions await discovery. Aiming at making the most of these opportunities, on Sunday 23 October 2016, Athens Office CSR Committee organized a guided day excursion to the historical Acrocorinth Castle, the archaeological site and museum of Ancient Corinth and Lake Doxa.

The impressive walls of the castle at Acrocorinth successfully resisted the attacks of invading armies for centuries. Resting at almost 600m above sea level, the castle offered us wonderful unobstructed views of the surrounding areas, allowing our eyes to dwell on the horizon, in a way that the city very rarely permits.

The ruins of the market and temple of ancient Corinth together with a gem of a museum located inside the archaeological site challenged us in imagining the metropolis at its peak and broadening our understanding of the reasons why the surviving city reached such heights during antiquity.

Lake Doxa, located in the middle of a wonderful forest of verdant firs, pines and oaks at an elevation of 900m, offered us precious moments of calm.

The mix of beautiful nature with cultural landmarks presented us with a much needed change of scenery while also being thought provoking, forming the ideal backdrop for us to bond in the true spirit of the CCC family ideal.

Tengiz Camp New Year's Celebration

As part of our CSR activities and with the support of project management, we arranged a New Year's Eve celebration at our Tengiz camp.

The local orchestra provided the music and many types of delicious food were laid on.

The mood of the New Year's Eve celebration brought positivity and happiness to all the employees who were far away from family and friends.

The project management extended their best wishes for the New Year 2017 to all and encouraged them to participate in social activities.

BTO STAFF

The Sixth CSR Lebanon Forum

As part of CCC's contribution and commitment to CSR principles and values, a number of CCC staff from the Beirut main office attended the Sixth CSR Lebanon Forum held at the Phoenicia Hotel on 27 October 2016.

During the one-day event, numerous prominent speakers discussed different aspects of CSR initiatives mainly in the financial and international sectors and the resulting social impact and benefits to all parties involved.

The speakers also presented different solutions to solve business sustainability challenges based on actual and proven experiences.

The forum also highlighted the growing leadership role of women in organizations and the need to encourage this positive trend.

Al Mouj Muscat Marathon

The sunny and cheerful morning of Friday 27 January 2017 was the Muscat date for a fantastic athletic and social event which is the Al Mouj Muscat Marathon. This was the sixth edition of this event, but it was the first time that it was organized in cooperation with Al Mouj Muscat and Oman Sail.

The event was well organized and the atmosphere was very cheerful and friendly. The event consisted of three race categories: a full marathon, a half marathon and a 10km run. 1,333 runners of both genders and different ages registered in the three races categories: 161 in the full marathon, 402 in the half marathon and 770 in the 10km race.

As this event registration starts early and is usually closed by 31 December or earlier, depending on the number of the registered runners, we at CCC started the campaign to recruit the running team in early November 2016. Only ten requested to register but two of them declined later for medical and/or personal reasons.

The CCC running team consisted of two females and six males and they are:

Al Mouj Muscat Marathon

- Hanadi Abu Middian
- Hiba Jamal
- Hussein Taha
- Maamoun El Hajj
- Abdel Rahim Kaddoura
- Mohammad Aburajab
- Sameh Daher
- Vassilis Agapitos.

All of them ran the 10km race except Vassilis who ran the half marathon. And most of them were taking place in such a race for the first time, except Hanadi who won the third position in the Athens 5km race in 2007 and Vassilis who had participated in more than one race in Athens (either the 10km or the half marathon).

Concerning the other team members, most of them play football and basketball and some of them practice running and yoga.

The team members made a great effort to train for the event and used to run almost every day.

Special T-shirts were prepared for the team with the CCC logo on the front and with "CCC Running Team" on the back.

On the day of the race, the team gathered at Al Mouj Muscat for group photos at around 8:30am, except Vassilis who already started his half marathon race at 8:00am.

The 10km race started at 9:00am and it was a fantastic scene watching the 670 runners going through the race route. The first runner to finish the 10km completed the race in 35 minutes and 59 seconds.

After the race each of the team members collected his/her finishing medal, and then we all gathered again to celebrate this occasion and have a group breakfast with their families. It was a very nice atmosphere and every one of the team was pleased with his/her achievement and every one of the team is looking forward to repeating this experience next year with more and better training.

Sustainability & Environmental Initiatives

"Future generations will be living in a world that is very different from that to which we are accustomed. It is essential that we prepare ourselves and our children for that new world."

H.H. Sheikh Zayed bin Sultan al Nahyan

CCC is committed to carrying out its activities in an environmentally friendly manner by reducing the environmental burden and improving environmental efficiency wherever possible. We need to consider the longer-term perspective, for our own wellbeing and for generations to come.

At Automated People Movers Head House Project, Abu Dhabi New Airport Extension, with teamwork and management support, we concentrate on promoting sustainable and environmental initiatives that include protecting water resources, promoting sustainable material resources, limiting energy consumption, protecting soil resources and a Reduce-Reuse-Recycle waste strategy. Here are some of the initiatives that would be a lesson learnt and examples to be implemented for CCC projects illustrated with pictures.

- Waste Management Reduce-Reuse-Recycle: Segregating C & D waste and disposing it in designated areas, afterwards sending them to the certified disposal facilities in Abu Dhabi. APM Head House Main Waste Management target is to eliminate or reduce the production of waste wherever possible. When elimination of waste is not possible, recover and recycle the waste material.
- To encourage the use of green certified, rapidly renewable materials and FSC certified wood.
- Extra masonry block tiles and plywood sheets are used to cover cable manholes and concrete openings to safety purposes.
- Used gloves are being re-used to cover the sharp edges of steel scaffolding elements for safety purposes.
- Concrete testing blocks reused for temporary works or decoration on site.
- Construct recycling waste bins for office use (e.g.: to contain aluminum, paper, plastic) made of wood waste.
- Reuse contaminated soil in temporary work structure.
- Drinking water filters are fixed on site and water quality testing is being conducted on a monthly basis to assure the water quality as per the standard limits.
- Provide secondary containment for fuel driven machines to prevent soil contamination.
- High efficiency water fixtures are fixed in the site offices, to reduce water consumption 5-10%.
- High efficiency AC system and light fixtures (i.e.: LED lights) are fixed in the site offices, to reduce energy consumption targeted 5-10%.
- Provide stickers that promote saving energy "Switch off ... Save Energy".
- Conducting dust control using the dewatering water pumped out from site instead of using new potable water.
- All reinforcement steel is being purchased as cut and bend as per the project requirements. This will reduce the amount of steel scrap that results from manual cutting and bending of standard full length steel bars onsite.
- Collection of water generated from the condensation process of the AC system behind the APM HH office and use it to water and sustain the plants.
- Procuring regional materials, to encourage the selection of materials that will have reduced transport needs and sustain the localized economy (cost of regional materials equal to 20% of total material cost).
- Wood waste made in the shape of a hand in order to promote safety and the environment.
- Removing the contaminated soil by mixing it with fresh concrete used for construction activities.
- Conduct TBT on monthly basis for the engineers, supervisors and labourers regarding FOD, chemical handling, waste management and housekeeping, in order to spread awareness and maintain a good environmental performance on site.

Special thanks go to the CCEP team at the APM Head House Project for making this happen.

H. RADY

Armada™ for IBM® Maximo®

Construction Equipment Management and Maintenance Solution

Armada™ is a unique, fully integrated construction fleet management and maintenance solution using IBM® Maximo® for Transportation, an end-to-end layer-based B2B Cloud solution delivering 'asset-intensive' industry-focused interfaces to allow PMV personnel to manage construction equipment and fleet within one system that is tightly coupled to company's procedures, best practices and experience.

Armada® leverages valued enterprise asset management elements and features adequately contoured to meet contractors' needs with a solution enriching the construction equipment management experience like never before.

Proudly, Armada™ has widely been recognized for vast implementations with proven successful ROI and savings since 2012, leading CCC to becoming a strategic business partnership with IBM to bundle Armada™ full suite covering the modules and functions described below,

BENEFITS

- ✓ **Boosting** visibility and control of assets
- ✓ **Achieving** higher levels of asset performance through increased availability and reliability
- ✓ **Standardizing** maintenance processes and consolidation of operations
- ✓ **Streamlining** the procurement and supply chain processes for parts and consumables
- ✓ **Improving** accountability and utilization
- ✓ **Leveraging** best practices and sharing know-how among users
- ✓ **Facilitating** site, customer and statutory compliance regulations
- ✓ **Improving** service levels and contract management
- ✓ **Reducing** inventory overheads, shortages, obsolete parts and shrinkage

treated as one fully fledged suite, which covers the following modules and functions:

Equipment Register "Master file"

Armada™ acts as Master Data Management (MDM) of all equipment related information from cradle to grave, comprehensively covering company owned, JV owned, third party equipment including hired, sub-contractors' and MSEs'. As an 'Asset Centric', it's the all-in-one passport from purchase/lease to retirement with full tracking of CAPEX and OPEX, inclusive to other artifacts: equipment classification, equipment assembly management, equipment movement and history, and so on.

Equipment Mobilization Scheduling and Bar Chart

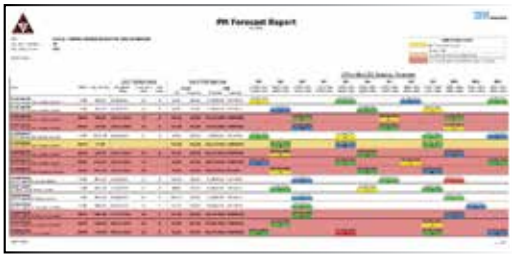
Armada™ offers an intelligent planning and scheduling tool for PMV personnel to derive intellectual decisions fulfilling newly awarded project requirements by conveniently allocating and identifying shortfall lists and generating potential new investment lists of equipment through a filtering engine that considers the country of the project, allocated/earmarked equipment, condition of equipment, technical specifications and so on. It is also a collaboration tool between project PMV and Athens office PMV to fulfill the up-to-date project plant requirement, forecast and actuals against the initial budget.

Armada™ for IBM® Maximo®
Construction Equipment Management and Maintenance Solution

Equipment Timesheet and Billing

Armada™ utilizes Digital Pen based technology for timekeeping equipment time-cards on a frequent basis detailing the utilization in working hours, idle hours and under repair hours, with an addition to a cost dimension to track each cost code or activity threshold in machine hours, in which can be treated as financial figures for progress reporting and forecasts. Plus it's the heart of the equipment recovery or ROA: the billing process is fully automated where the application handles the summarization of total working hours, deducting major under repair hours and excess hourly rates to conclude a unified bill per equipment.

Equipment Work Management and Maintenance



Armada™ is the core heart of maintenance, with its state-of-the-art analytical engine based on characteristics, conditions and various factors. Armada™ leverages forecasting capabilities for PMV workshop personnel to optimize and schedule all their day-to-day equipment work related information from inspection using Digital Pen, to preventive maintenance, and corrective maintenance 'repairs', inclusive of tasks done, material and spare parts consumed, labour hours and meter reading, work scheduled/actual start/finish dates and so on.

Armada™ drives Maintenance lifecycle from reactive to proactive approach using maintenance three weeks look ahead, three months and six months forecast plans for the work to be carried out, with assessment in resources leveling and BOQ of spare parts which enhances impact on inventory availability, purchasing power and ultimately and essentially reducing equipment downtime.

Inventory and Purchasing

Armada™ focuses heavily on the supply chain cycle from requisition to issue, along with an advanced cost management to secure the proper cost allocation and charges whether against site, or store, or equipment, or work order.

Purchasing

Armada™ Purchasing governs the purchasing cycle from inception using a dynamic BPM workflow engine that assures synergy between different PMV personnel involved in the procurement process based on role and authority.

Armada™ Purchasing improves integrity of finding the right spare part for the right equipment through a rich library elaborated progressively by a dedicated CMC team, in which they OCR Manufacturer manuals and upload it to an online HTML5 'Amazon' like shopping cart called 'iCatalog' and that powered by well-known in-house 'iBuy', with added benefits to being reachable through any browser(even smartphones) that in return allows access for PMV personnel to 100,000+ unique OEM part numbers of different manufacturers, defined and positioned according to the global vehicles maintenance reporting standard (VMRS).

Armada™ Purchasing has extended integrates with the Caterpillar SIS Parts Order Management system giving an edge to assuring valid and correct parts ordering and visibility of prices per dealer. Integration to other manufacturers is in progress as well.

Inventory

Armada™ Inventory acts as the reservoir of the purchasing cycle with sophisticated balance whether on storeroom or bin level and can be detailed to segregate the balance based on the condition of the item with different costing, which ranges from either standard, or FIFO, or, LIFO. Even powered with smart tools for inventory count, stock adjustment, Item safety stock and re-ordering levels, ABC Analysis, and vendor analysis all provide great assistance to store personnel in managing their work effectively.

Armada™ Inventory also has the flexibility to transfer items among different storerooms within the same site or different sites with visibility over item availability in all storerooms to prevent purchasing before checking intercorporate storerooms.

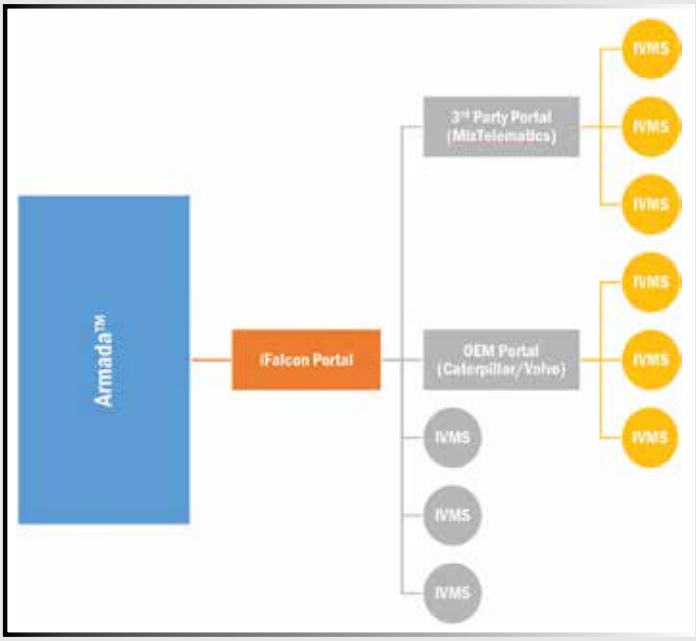
Fuel Management

Fuel has been and still is the true blood stream for any operating site, utterly the prime necessity for construction survival, that impossibly can't be waived from its existence, and yet can be the tip of the iceberg due to cost recovery caused indirectly from its overconsumption, siphoning, leaks and more inevitably, deficiency in reporting and analyzing instantly for all those recurring incidents.

With Armada™, Fuel Management becomes more autonomous, offering a suite in tracking the equipment fuel consumption, the carbon footprint and fuel supply chain management using integration of Smart technology for data collection and control i.e. Smart Self-Fueling, FuelGuard Mobile App and Telematics.

KPI and Real-Time Reporting

Armada™ extends its Big Data with a set of analytical toolsets i.e. Watson to enrich S.M.A.R.T KPIs categorized per user-defined Dash portals accessible to various owners i.e. plant admin, plant engineer and storekeeper, which deliberately enriches their service availability, serviceability, maintainability and reliability of the target business function i.e. stock re-order, pending work orders.



Telematics Ready

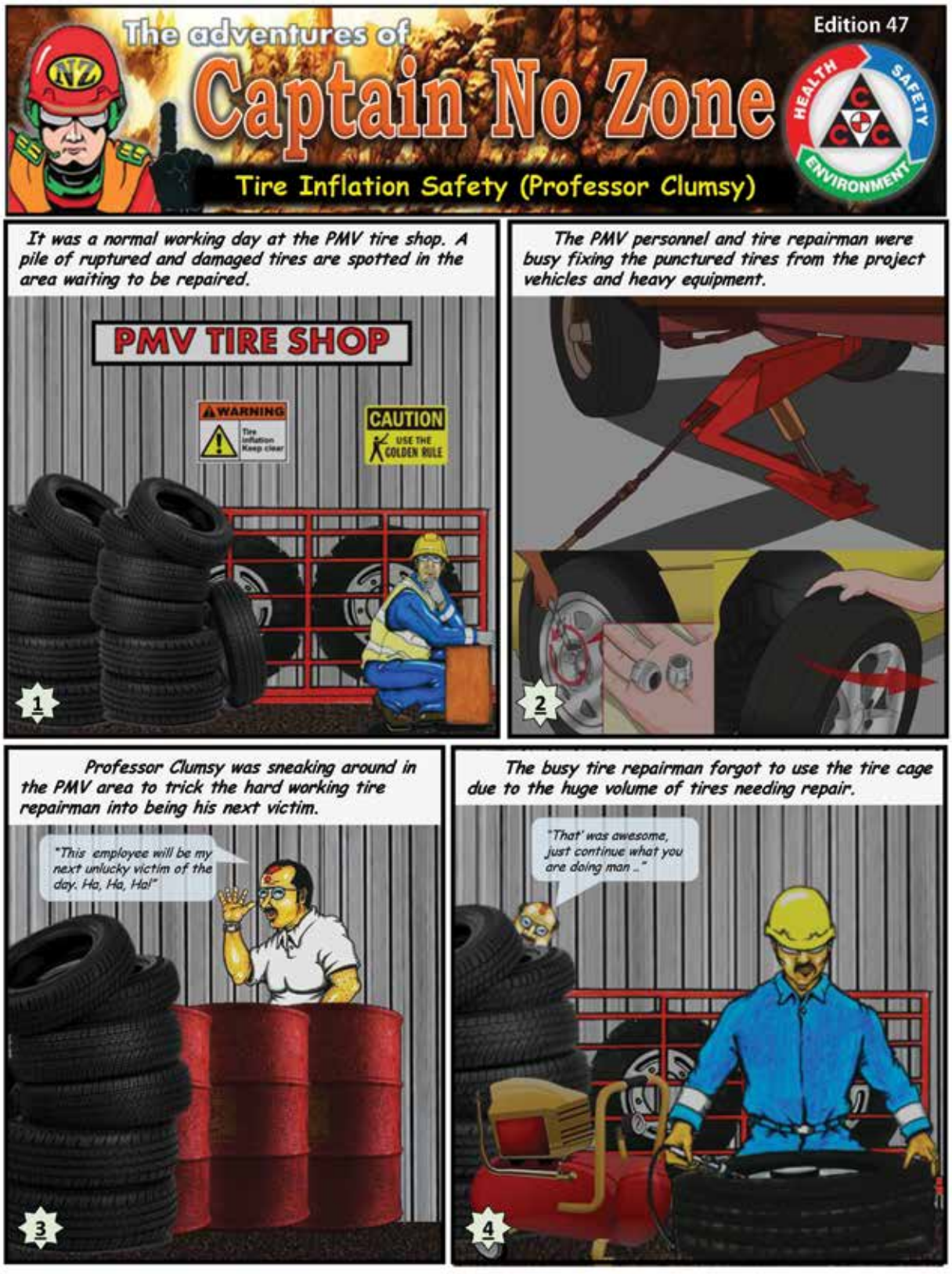
Armada™ brings SaaS cloud BPM platform for pervasive transformation to understand, reason and learn various cloud-based in-board vehicle monitoring system (iVMS) to mainly capture the meter reading, geolocation and equipment error codes, various integrations includes Trimble and iFalcon™ Telematics cloud.

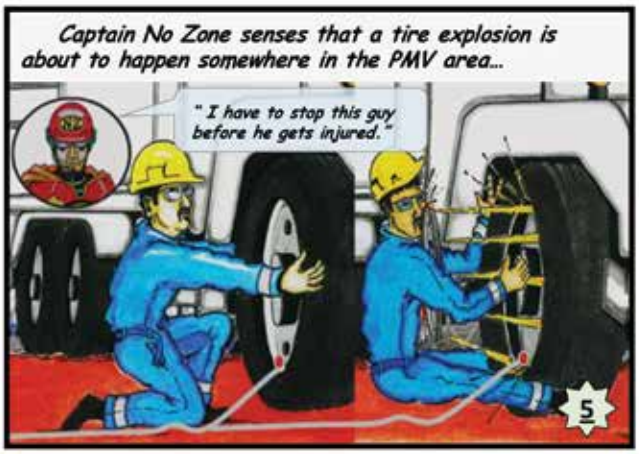
Future Advancements

Armada™ continues to foster an emergence of cognitive efficacy on equipment and vital business processes through trend analysis and conditional-based monitoring fed using IoT service enablers i.e. Machine Control, Safety Hazards, BIM and Automated Data Acquisition Tools (Barcode, RFID, and Tablets).

J. MANGILA / O. REED

Captain No Zone & Tire Inflation Safety

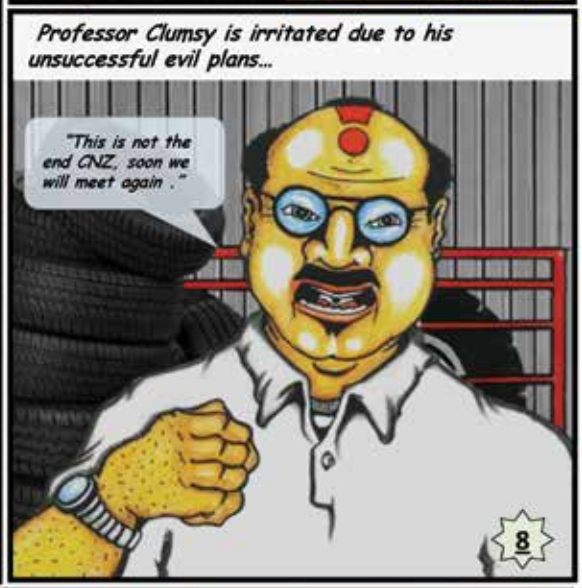




TIRE INFLATION SAFETY GUIDELINES:

- **TIRE AND RIM SERVICING CAN BE DANGEROUS** and must only be performed by trained personnel using proper procedures and tools.
- **ALWAYS** consult with your supervisor for proper safety procedures prior to inflating any tire.
- **ALWAYS** center the tire in the cage in an upright position. Rotate the tire so that the inflation valve is between the cage tubes for better access.
- Clean the inflation area and tire of all loose debris.
- **ALWAYS** use a clip-on inflation connection with remote inflation and deflation valve and a sufficient length of air hose to stand well clear of the wheel during inflation.
- **DO NOT** use an inflation cage on tire assemblies rated more than 120 PSI.
- **ALWAYS** wear adequate protective eyewear and face shield, protective footwear and ear protection while servicing tires to avoid injury.
- **DO NOT** reach into the cage area, rest or lean any part of your body against the inflation cage during inflation.
- **NEVER** stand in the trajectory zone.
- During inflation, if ANY sidewall undulations or bulges appear or if ANY snapping, cracking or popping noises occur — **STOP IMMEDIATELY! DO NOT** approach tire. Before removing from the restraining device, completely deflate the tire remotely. Remove the clip-on connection. Mark tire as damaged for potential "zipper rupture". Label the tire unserviceable, non-repairable and dispose of it.

7



Water Mega Reservoir Safety Award

On 12 February 2017 the Water Mega Reservoir Project, Package C (Qatar) achieved 10 million man-hours without a lost time injury.

To mark the occasion the project held a celebration on Thursday, 2 March 2017 that was attended by the consultant, the PMC and the client. During the ceremony the client, KAHRAMAA, presented CTJV with a certificate of accomplishment. In addition, the Country Managing Director of ARCADIS, the project detailed design and site supervision consultant, Jack Overkamp, who also attended the ceremony, presented the project with a certificate of recognition for this achievement. In their words, addressing the project management team and the awardees, the client and consultant management conveyed their utmost appreciation for CTJV for the safe execution of the works.

CTJV Project Director Ziad Kamel in his turn committed to delivering the project as scheduled, safely and to quality specifications, thanking the client and the consultant for their support.

During the ceremony 92 certificates and gift items were distributed by the project leadership to employees who had made the most contribution to this achievement.


KAHRAMAA
Qatar General Electricity & Water Corporation

Certificate of Accomplishment

This certificate has been issued to

Consolidated Contractors Group / Teyseer Contracting Company JV - CTJ

In recognition of achieving 10 Million Man Hours without Lost Time Injury

From the Technical Affairs Directorate-Water Projects Department
During the Construction of the Water Mega Reservoir Project
PRPS 5 (Package C) GTC 626C/2014, Al Thumama - Qatar

Mohammed Salem Al Mansoori
Manager - Water Projects Department
February 2017


ARCADIS

CERTIFICATE OF RECOGNITION

Health and Safety Achievement

This is to acknowledge

Consolidated Contractors Group / Teyseer Contracting Company - JV

For achieving 10 Million Man-hours without a Lost Time Injury on the Water Mega Reservoir Project, PRPS 5, Al Thumama, Qatar

March 2017

Country Managing Director

M. HYASAT

Safety & Fire Protection Conference, Dammam

CCC Saudi Arabia participated in the 6th Safety & Fire Protection Conference held under the patronage of the Prince of the Eastern Province, HRH Prince Saud bin Naif Al Saud, from 9-10 November in Dammam, Saudi Arabia.

The Saudi Council of Engineers (SCE) organized this conference with the theme "Compliance to Standards is a National Demand''. This year's conference addressed a number of topics relating to fire protection/response and safety standards, including: industrial fire risk, fire protection, fire engineering training and education, industrial firefighting, disaster preparedness and incident management. The topics and conference papers focused on the importance of standards as a national demand.

Over 700 industry professionals regionally and internationally attended the conference. In addition, it was the only conference dedicated to the fire and safety field. Participants attended the technical sessions and discussed the latest developments and advancements in safety & fire protection. Attendees also showed a keen interest in sourcing potential new business partners and meeting the decision makers from safety industries, insurance companies, security companies, construction companies, the fire service and end users.

During the exhibition, CCC took the opportunity to expand its presence by meeting with various contractors and suppliers face to face in related business.

The SCE Public Relations Manager, Abdul Nasser Saif, honoured CCC's team for their effective participation in this event and called for more participation in future SCE events.

From left to right: Motasem Hyasat (CCC), Abdul Nasser Saif and Mustafa Reda (SCE)

Supplier and Subcontractor Sustainability Self-Assessment

For companies to successfully manage their sustainability impact which includes economic, environmental, social and governance issues, it is necessary to ensure that their suppliers and subcontractors are following suit.

The experience of Nike is renowned. Not so long ago when the brand was shamed for the use of child labour at its factories, the company insisted that the working conditions of its contractors' facilities were not its responsibility. With a tarnished reputation and significant profits lost, Nike's founder later confessed that the Nike product has become synonymous with slave wages, forced overtime, and arbitrary abuse". Regarding the construction industry, a research in the UK focusing on 35 major contractors revealed that there is lack of information, particularly about the environmental impacts imposed by their suppliers and subcontractors.

There is a growing need for suppliers and subcontractors to recognize their responsibility to safeguard the environment and nurture positive relations with their workers and local communities. As a result, a significant number of organizations are engaging with their supply chain partners to address sustainability related subjects and encourage them to improve their performance. Companies such as Saipem, Laing O'Rourke, Skanska, Vinci and several others are sending a strong message to these partners about what they seek from them. Procedures are being set up to evaluate suppliers' and subcontractors' competence against criteria which go beyond the traditional spectrum of price, quality and delivery and require compliance with sustainability, HSE and ethical standards. Their compliance with these requirements is monitored through questionnaires, supplementary technical documents and audits.

Benefits of embedding sustainability principles in supply chain decision making:

- Risk Mitigation: by verifying effective management systems are in place (covering: Environment, HSE, Anti-Corruption and so on).
- Enhance Corporate Reputation: by displaying responsible supply chain management.
- Waste and cost reduction: by concentrating on partners experienced with recyclable, reusable and bio-degradable products.
- Sustainable Construction Expertise: by procuring products and services for green projects.

Clients are consistently assessing CCC on key themes such as quality, health and safety, resource efficiency and anti-corruption. Therefore, it is only natural for CCC to expect its suppliers and subcontractors to adequately respond to these matters and monitor their performance accordingly.

Recognizing that suppliers and subcontractors are business partners that hold a significant role in the execution of CCC's projects and can also influence public perceptions of our corporate accountability, an assessment tool was developed. Based on established standards (of the Global Reporting Initiative) and using Fanous as a platform, a self-assessment checklist was put together involving CCC's Sustainability Taskforce and Community of Practice (CoP) members. The objective of this self-assessment form is to help suppliers and subcontractors understand CCC's performance expectations. The logic is to ensure their compliance with all domestic legislation, applicable international regulations and corporate principles.

CCC's Suppliers & Subcontractors Sustainability Self-Assessment Form (see extract opposite) covers the following categories:

- Environment.
- Labour Practices.
- Human Rights.
- Local Community.
- Compliance.
- Anti-Corruption.

Laffan Refinery 2 Project Case Study

Following senior management approval, CCC Areas and projects were involved in investigating how this assessment could be integrated into corporate operations. At Laffan Refinery 2 Project in Qatar, as a preliminary scheme, an intelligence exercise was carried out which included identifying and engaging with subcontractors. Thereafter, the self-assessment was sent to two major partners: the

first covered insulation, fireproofing and refractory and the second covered non-destructive testing (NDT). Both completed the self-assessment and submitted supporting documents demonstrating their commitment to the environment, health and safety as well as corporate ethics.

With the above case study completed successfully, the plan is to expand CCC's engagement with suppliers and subcontractors per the table.

Managing Supply Chain Partners in CCC

STATUS	OBJECTIVE	ACTION
New/Future Projects:	Holistic Decision Making *(covering environmental, economic and social aspects)*	Incorporate the self-assessment in the tender preparation process
Existing Projects:	Track Compliance	Distribute the self-assessment to commissioned major partners and assemble the information

	Consolidated Contractors Company Suppliers & Subcontractors Sustainability Assessment Form	Doc. ID: CCC-SUS-FRM-SCA-001 Revision No. 00 Revision Date: Page 1 of 3

Category	Indicator	Description	Assessment			Comments & Evidence	Score	CCC Comments
			Yes	No	N/A			
1. Company Management	1.1 General	Does the company have a management person responsible for Sustainability? If Yes, please provide name & e-mail.						
		Does the company publish a Sustainability Report / Corporate Social Responsibility (CSR) Report? If yes, please provide web link or copy of the report.						
2. ENVIRONMENT	2.1 Environmental Management	Does the company have a defined Environmental Management System, including (Recycling, Waste, and Hazardous Materials Management)?						
		Does the company have a written Environmental Policy with objectives that identify the environmental impacts of the business?						
		Is there a training program for employees regarding Environmental Awareness?						
	2.2 GHG & Energy Usage	Does the company have programs to conserve Energy & Fuel?						
		Does the company have Energy, Fuel & Greenhouse Gas Emissions Reporting Programs in place?						
	2.3 Water	Does the company have programs to conserve water and reuse/recycle water?						
		Does the company have water consumption reporting programs in place?						
	2.4 Materials	Does the company have Procurement Plans identifying the use of Green Products (recyclable, reusable, non-toxic, bio-degradable, and post-consumer recycled materials) and locally manufactured products?						
	2.5 Waste	Does the company have research and awareness about identifying Green Products (recyclable, reusable, non-toxic, bio-degradable and post-consumer recycled materials)?						
	2.6 Green Solutions	Does the company have a proven experience in using and implementing green solutions in sites & camps (examples in either: renewable energy, energy efficiency, water conservation or waste management?						

F. HIJAZI

Zuhair Haddad

Making Construction More Scientific

On 11 April 2017 and during the CETI Award Gala on the second day of Fiatech's Annual Technology Conference held in Orlando, Florida, Zuhair Haddad was awarded the James B. Porter Jr. Award in recognition of his achievements in technology leadership and innovation.

The Porter Award recognizes an individual or organization that best embodies Jim Porter's vision, leadership, technical acumen, commitment to people, his tireless efforts to advance the capital projects industry and to see that the goals of Fiatech came to fruition.

The Strategy

After earning his master degree in construction management from Stanford University and joining Bechtel as a junior estimation engineer, Zuhair rejoined CCC with a vision to "execute a culture changing Project Control strategy that will put CCC ahead of its competitors in the market."

The strategy was approached in a phased methodology starting with a set of construction oriented ERP solutions covering supply chain and financial systems. Phase 2 was the age of document-centric solutions and the 3D evolution implied by BIM and 3D-Centric solutions. Starting with 3 BIM centres established in Cairo, Athens and Palestine, the era of 3D management tools began with Civil and Buildings projects. The phase mandated the development of workflow engine for Business Process Management (BPM), Dashboard for visual Business Intelligence (BI) and 3D Lean-based project controls linking visual model to backend data. The phase was completed with advanced document management capabilities and planning tool comprehended with a multi-phase multi-discipline hand-over solution using visual 3D model as a front end.

Phase 3 was the real challenge to put all these solutions together.

Communities and Awards

Zuhair built collaboration bridges with many reputable international organizations and communities in different domains. Just to name a few, Fiatech for technologies and innovations in construction industry, IPLOCA for pipeline industry, 5D Initiative for 3D modelling and lately by holding the BIM conference Middle East for the fifth time. On top of these collaborations is the one established with CIFE, the Center of Integrated Facility Engineering, in Stanford.

Zuhair during his speech at Fiatech upon receiving the award

Zuhair's award is not the first (and surely it will not be the last): Zuhair received multiple awards from many of these reputable communities whether to Zuhair personally or to CCC in recognition of their advanced achievement and contribution to the industry.

Throughout the years, all the above couldn't be achieved without the critical role played by CCT and RASO. CCT, as the software arm of CCC, was a necessity to translate this vision into advanced technology solutions and RASO as the implementation arm of ISD.

In the prize giving ceremony, Jim Purviz, Chair of the Fiatech Board of Advisors, said: "... Today, CCC leads the industry in the adoption of new technology to improve construction efficiency and enhance project controls.

We consider Zuhair a role model champion for successful new technology implementation. Not only does he embrace the technology, he defines the value within his company and they implement the technology that gets value.

The additional value to those of us in the industry is that Zuhair is willing to have his organization share that experience (successes and failures) with the rest of us. He and his team have been inspirational supporters of the PAT

Zuhair with the transitional president of Fiatech, Dr. Bill O'Brian

Team Success Enabler Survey work that will allow us to share what we know with everyone in the industry."

In his recorded message to Zuhair, Dr. Martin Fischer congratulated Zuhair and added: "Zuhair is the most conceptual construction practitioner I have had the pleasure to work with".

In a follow up email, Robert Wible, Fiatech Senior Project Manager, said:

"Over the years your and CCC's contributions to Fiatech and to its members have been incredible. This year I would even say they have become LEGEND… We cannot begin to thank you and your staff enough for your leadership and support!

We hope you and CCC enjoy this well-deserved honour and recognition by your peers."

In his speech, Zuhair thanked Fiatech for the award and CCC staff for their dedication and commitment.

Congratulations to Zuhair, ISD and CCC for this prestigious recognition.

2D barcode link to videos on YouTube
(Scan the QR code to access the award ceremony)

About Fiatech

Fiatech is an international community of passionate stakeholders working together to lead global development and adoption of innovative practices and technologies to realize the highest business value throughout the life cycle of capital assets.

Fiatech's vision is in transforming the world's infrastructure delivery and operations through innovation.

BASSAM DAHER

My Journey with CCC

Similar to many executive colleagues in CCC looking back at all the years that we spent as members of this organization, leave mixed feelings for what we have achieved and left behind as valued memories. The achievements are not only professional but also personal. I wanted therefore to share in this article in few words a summary of my journey with CCC since graduation till the present time.

A. Since joining CCC in July 1979, immediately after graduation from AUB, I can summarize my experience record in three phases:
   - **Phase One - 1979-1995 Projects in KSA, UAE, Tunis, Yemen, Egypt.**
     - ↳ Site Experiences: Between 1979 -1984 and between 1992-1995.
     - ↳ Office experiences: Between 1984 -1992.
   - **Phase Two - 1995-2009 Area Management Egypt.**
   - **Phase Three - 2009-2016 Area Management Egypt, Sudan and Libya.**

B. **Personal Achievements**

During my period of service with CCC, I got married in 1986 while serving at Hammam Military township project in Alexandria. My boys Ramzi and Omar where born during that period, while my daughter Sara joined the team while I was working at Laboos Project in Yemen.

Ramzi completed his Masters Degree - Operations Management in 2009 at Western Sydney University and is currently working for Woolworths, Sydney as planning and account manager.

Omar got his Civil Engineer degree in 2014 from the same university in Sydney and is currently working there in the building construction industry with various clients.

My daughter Sara graduated from AUB as a graphic designer and then got her Masters degree from the University of Arts London. Since graduation she has participated in many art fairs in Sydney, Singapore and most recently in New York.

C. **Work Achievements**

- **During Phase One** of my career the most challenging project was in Yemen. My life was at stake during the civil war that had erupted in May 1994. I was on my way from Laboos to CCC camp in Aden, accompanied by CCC Dr Najeh Sadek when a group of unidentified rebels hijacked our car and even

fired between our legs. Both our lifes were saved just by few inches from the bullets. Despite that incident I am still proud of the recognition letter that was issued by the consultant which shed some light on the difficult working environment in Yemen at that time.

- **During Phase Two**, I managed to add CCC Egypt as an operational area on the CCC map. The journey started in 1995 with the first award for a $4 million contract in Alexandria to the recent award in 2016 for a $322 million in Cairo and the journey of awards is still ongoing. Nowadays, CCC is a trusted player with the Ministry of Electricity witnessed by the successful participation and execution of nine power stations in various parts in Egypt. Today CCC is also considered a major player in the market with a total of 20 contracts executed so far. During this phase CCC managed to build a sound and reliable JV partnership with Allam Construction which is a reliable Egyptian firm. This partnership added strength, image and reliability to CCC in the market.

  During that phase, Morganti got awarded four additional important contracts with USAID and UScorp as well.

- **During Phase Three** I was entrusted with follow-up operations in Sudan and Libya (to look after the existing projects there). These areas were considered to be promising markets, however unfortunately due to the unrest and economic situation we had to reduce our participating strategy to the minimum. We still hope however that the working environment will improve in these countries in the future.

Engagements and Marriages

Omar Taher (LMH Project, Qatar) would like to announce his engagement to Lena Khayat. The happy occasion took place in Ohio, USA on 11 March 2017.

Baby Boys

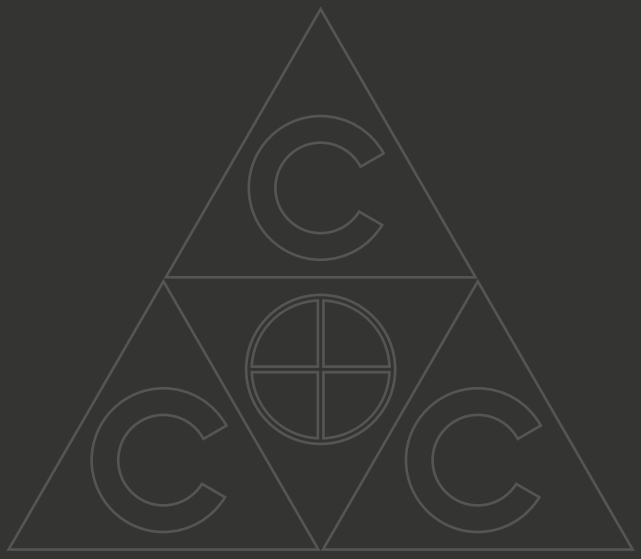
Gaven Savio Gomes (WMRC Project, Qatar) and his wife Angela are happy to announce the arrival of their new baby boy named **Felicio Anthony**. He was born on 31 January 2017.

Joji James (JRUP Project, Saudi Arabia) and his wife Julie are very happy to announce the birth of their second baby, a boy named **Jerome**. He was born on 10 February 2017 in Ranni, Kerala, India.

Wael Qaisiyeh (RASO, UAE) and his wife Haneah AlKhateb are very happy to announce the birth of their first baby boy, **Karam Qaisiyeh**. He was born on 22 March 2017 in Dubai, UAE.

Baby Twins!

It is with great pleasure that we announce the birth of twins, **Abdulrahman** and **Mohammad**, who were born on 7 February 2017. The proud parents are Mohanad Salah (Riyadh Metro Project, Saudi Arabia) and his wife, Samah.



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The BULLETIN is a publication issued at CCC in Athens by volunteer staff.