



NEWS

CR Asia

November 2019

Issue No. 29



**CRAT's biggest project
on record**

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THE GROUP PERSPECTIVE

By Mark Stansfield



CR Asia continues to be extremely busy in 2019 with the business forecast to achieve growth and employee number targets for the year.

Thailand will complete the largest project the company has ever undertaken with the construction and maintenance works for the SPRC shutdown. In addition, the Thailand business completed several Parex reloads and was the first to implement the Group's Advanced Wet Dumping system, which was successfully deployed for the IRPC catalyst change-out and the Nghi Son Refinery atmospheric residue desulphurization (ARDS) catalyst change-outs during the year.

The Thailand business secured a long-term continuous presence contract at PTTEPS1 with around 77 personnel on site daily.

Our Indian business has also completed record levels of catalyst change-outs, 25 shutdowns, a Parex change-out, several decoking and mechanical projects and has commenced the Group's first engineering, procurement and construction (EPC) contract for ONGC Mangalore Petrochemicals Limited (OMPL).

The comprehensive maintenance contract (CMC) for the world's largest refinery continues to perform well, taking over an additional two plants and regularly employs over 2,000 personnel.

The CMC team completed 20 shutdowns over the year, all of which were completed on or before schedule.

The new Jamnagar yard construction was completed in October and expansion of the existing Mangalore yard is well progressed.

India completed several tubular reactor change-outs, further consolidating the Indian business as the preferred contractor for this specialised area.

India secured several additional long-term contracts in the year, including a number of decoking and catalyst handling contracts, further establishing the company's strength in the market.

The Singapore and Malaysia teams have been busy as well. The Malaysia business was awarded a 3 + 2 year contract for the change-out of the ARDS reactors at the Refinery and Petrochemical Integrated Development (RAPID) plant and is mobilising for the 5 + 3 + 2 year daily maintenance and

turnaround (TA4MS) contract at the RAPID facility with a Malaysian partner. The new workshop and yard near the RAPID site in Malaysia will be completed in November.

Singapore has successfully deployed the CR Asia Dense Loading machine on a number of projects while the use of Rover, our catalyst handling remotely operated vehicles, are increasing across the Group reducing the risks of exposing our technicians to confined spaces and inert atmospheres.

The new enterprise resource planning (ERP) system roll out is completed in Thailand and well underway in India. Our new website and LinkedIn page are completed lifting our profile in the market.

As the year comes to a close, I urge you all to remain focused on being safe in all that you do. We have a lot of work to complete before year-end, and we want you all to be safely with your families at the end of each shift. Please be vigilant in identifying hazards on site, always follow job/safety procedures and take care of your workmates.

On behalf of the CR Asia Board of Directors, I want to thank you all for your continued commitment to the company.





CR ASIA THAILAND

CRAT'S LARGEST PROJECT ON RECORD - SPRC TURNAROUND 2019

By Suntorn Chonkhunthod

Star Petroleum Refining Public Company Limited (SPRC) has awarded CR Asia Thailand (CRAT) its largest project on record. The 2019 turnaround will include construction work and specialised maintenance services.

This project started in October 2018 with the engineering and planning phase of the job. Continuing with pre-construction, training, on-site construction, decontamination, cleaning, catalyst change-outs, cold cutting, inspections, repairs and other maintenance works until completion in December 2019. A total of 15 months' work to prepare for and execute a shutdown of only 45 days. CRAT estimates the required manpower for this project to be over 3,000 during peak periods.

SPRC was established in 1992 and became a key customer of CRAT in 1997. SPRC owns and operates a petroleum refinery in the Rayong Province of Thailand. The company provides transportation fuels and petrochemical feedstock. It is also involved in the production of liquefied petroleum gas, polymer grade propylene, naphtha, gasoline, jet fuel, diesel, fuel oil, crude, reformat, sulfur, mixed C4 and asphalt. SPRC is a subsidiary of Chevron South Asia Holdings Pte. Ltd.

CRAT - BLCP SUPPLIERS' DAY

By Jiraphat Kadyangngao

CR Asia Thailand (CRAT) participated in the 2019 BLCP Suppliers' Day event with the theme of "GO GREEN GO Together". Held in April 2019 at BLCP Power Plant Rayong, the event hosted management and staff from over 30 companies. BLCP hosts this annual event as a way to thank their partners and suppliers and also exchange ideas on ways to promote caring for the environment. The day's activities included the planting of 40 trees.

BLCP says, "Consider this a tree of friendship. This activity represents the power of cooperation and mutual assistance that the BLCP power plant has received over the past 10 years."

BLCP thanked all their suppliers for their contribution to safety success during the 2018 outage.



CRAT PREPARES FOR SPRC'S TURNAROUND

By Stephen Moss

Building on the successful turnaround carried out by CR Asia Thailand (CRAT) for Star Petroleum Refining Public Company Limited (SPRC) in 2014, CRAT anticipated it would be heavily involved in SPRC's next major event scheduled for November 2019.

CRAT has been actively planning this turnaround with SPRC for approximately two years. After establishing the scopes for both the maintenance works and the piping upgrade and revamp, the Fabrication & Installation Services area commenced offsite piping fabrication at the end of 2018. The engineering preparation had been ongoing for several months prior.

PLANNING WITH SPRC FOR TWO YEARS.

With a total scope of 130 tons of steel structure fabricated and 34,000 inch diameter welding of pipework in carbon and stainless steel, as well as Hastelloy material, up to 42-inch diameter. The team commenced installation within the live plant early 2019. A new steel structure complete with fire-proof coating has been fabricated and installed, while the associated equipment and pipework are nearing completion.



Staff and field personnel now number around 350, with a projected maximum of around 3,000 at the peak in the fourth quarter of 2019.

OVER 120 HEAT EXCHANGERS, 25 VESSELS AND EIGHT COLUMNS MAKE UP A PART OF THE 225 ITEM SCOPE.

Together with the project works, regular plant maintenance is executed simultaneously; over 120 heat exchangers, 25 vessels and eight columns making up a part of the 225 item scope. After several months of planning and scheduling, CRAT began tray mock-ups and have completed several of the exchangers' pre-event preparations. These preparations are greatly appreciated as it reduces the event scope.

Before maintenance works can begin, the plant must first go through a decontamination process by the Pipeline Service Division.

Teams from CRAT will then carry out mechanical maintenance works on the crude distillation unit (CDU), vacuum distillation unit (VDU), platformer and fluid catalyst cracking unit (FCCU). CRAT's Special Services Division will support both project and maintenance works with ultra high-pressure water jetting cutting (UHPWJ), diamond wire cutting, bolt torqueing, pipe cutting and flange machining. The Catalyst and High-Pressure Cleaning Divisions will work on change-outs and cleaning work throughout the entire event.

Human Resources and Operations teams are formulating the plan for recruiting over 1,500 people for the maintenance works alone. There is a significant amount of training and onboarding to be completed before the kick off in earnest on 1st November.

CRAT USES MOURIK'S MIDC LOADING TECHNOLOGY CATALYST CHANGE-OUT

By Nimit Supin



CR Asia Thailand (CRAT) collaborated with shareholder Mourik, using its MIDC loading technology to execute a tubular catalyst change-out for TOC Glycol's turnaround 2019.

Mourik's Modular Insert De-dusting Catalyst (MIDC) loading system greatly improves the efficiency and safety of catalyst loading in tubular reactors while maximising the catalyst performance. A modular system that uses specially designed inserts to load the catalyst to the desired height. By combining modules, the system can reach every tube in the reactor.

The job required the extensive organisation of resources to mobilise the equipment and implement the new MIDC method for unloading and cleaning of the reactor.

With exceptional cooperation from the CRAT team and support from CR Asia Group, the job was well executed, ahead of schedule.

CRAT RECOGNISED FOR ADVANCED WET DUMPING SOLUTION

By Saeng Kaewkomol

IRPC Public Company Limited (IRPC) awarded CR Asia Thailand (CRAT) a certificate for outstanding performance in May, for work carried out during the September 2018 shutdown at IRPC's RDCC plant in Rayong.

CRAT's Catalyst Handling Division piloted CR Asia's innovative Advanced Wet Dumping solution during the shutdown for IRPC. Proven commercially, Advanced Wet Dumping combines drilling technology with high-pressure water jetting to unload heavily fused catalyst whilst minimising man-entry.

The success of this technique in unloading the spent resid hydrodesulphurization (RHDS) catalyst effectively and efficiently combined with the overall collaborative team effort earned CRAT this recognition for outstanding performance. It also prepared CRAT for a much larger and more comprehensive deployment of the technology for a similar project in Vietnam.



CRAT REPAIRS STORAGE TANK ROOF IN BRUNEI

By Michael Velders



CR Asia Thailand (CRAT) was engaged by Shell Brunei to remove a partially collapsed storage tank roof. A total of 60 roof panels were removed using hydro abrasive cutting and CR Asia's patented track system.

Hydro abrasive cutting is a combination of ultra-high pressure water and garnets – perfect for cutting large roof panels. Our patented track system is ideal to perform a precision cut in any shape or length. The track is fabricated and rolled in the correct shape to ensure a quality cut is delivered each and every time in a single pass with in-situ weld preparation. Abrasive cutting with a track system helps to ensure a sharp, clean and precision cut.

The collapsed section of the roof was lying in crude oil and so it was crucial to use a safe form of cutting to eliminate any potential hazards caused by the presence of the oil.

In addition to removing the damaged roof, CRAT cut a door in the shell of the tank to provide easy access for cleaning and repairs.

The project was completed safely and to the client's satisfaction.

CRAT - TPX SHUTDOWN PAREX CHAMBER

By Stefan Breet



CR Asia Thailand (CRAT) executed the shutdown for Thai Paraxylene Company Limited (TPX) during June and July 2019. The petrochemical plant, located in Chonburi Thailand, plays a major role in generating revenue for the Thailoil Group.

The shutdown of the Parex chambers (Paraxylene unit) included the unloading of adsorbent, modifications to the centre pipe, installation of new grids and related piping and the loading of fresh adsorbent.

To ensure a continuous supply of adsorbent at the top of the unit, CRAT fabricated an overhead structure with three lifting points instead of the normal two. CRAT's new 3.2-tonne overhead crane increased the lifting capacity, which reduced the number of lifts required.

The unloading phase was completed successfully and the newly designed filter cyclone removed virtually all of the dust, saving the filters on the vacuum unit.

CR Asia's 4-drum automated drum tipper combined with the use of 2m3 tote bins improved the efficiency even further, as the drum tipping could be performed at ground level and the number of lifts significantly reduced.

The pre-welding of internal piping saved time during the installation phase and also minimised inspections.



CRAT - PTTGC VISITS TRAINING CENTRE

By Napaphat Tangwanittichakorn

Thailand's largest petrochemical and refining company, PTT Global Chemical (PTTGC), visited the CR Asia Training Centre in March 2019. CR Asia Thailand (CRAT) took this opportunity to present the company's overall services with a particular focus on the training centre. CRAT showcased how in-house training is managed, and the numerous authorised trainers within the organisation. Furthermore, CRAT shared how PTTGC can benefit from specific courses offered in the training centre, including:

- Confined Space & Breathing Apparatus
- High-Pressure Water Jetting
- Chemical Handling
- Mechanical Works
- Health, Safety & Environment (HSE)

Following the presentation, CRAT took the representatives from PTTGC on a tour of the entire facility including the training module. During the visit, CRAT performed a practical training demonstration for confined space entry. PTTGC was impressed to witness the training for themselves.



CRAT COMPLETES PAREX PROJECT FOR PTTGC #4

By Stefan Breet

CR Asia Thailand (CRAT) recently executed a Parex reload project for PTTGC #4 in Rayong, Thailand.

The job required the most comprehensive planning to ensure a timely completion, as the schedule was tight. However, the team from CRAT faced multiple challenges. The unloading phase of the job took longer than expected because the agglomerated absorbent was difficult to remove. The team needed to make up this lost time, so decided to weld the intermediate pipes on the top platform of the vessel, instead of inside the chambers where they would normally be welded. This initiative reduced the fit up time on the grids significantly and allowed the job to finish on schedule.

The client was pleased with CRAT's initiative to overcome the challenges faced. The job was well managed and executed safely.

CRAT - CATALYST CHANGE-OUT FOR BP TANGGUH LNG

By Sedthachai Jantrapan

In June 2019, CR Asia Thailand (CRAT) in cooperation with a local partner, PT. Kotaminyak Internusa (KMI) supported Indonesian client, BP Berau Ltd, during the annual shutdown of its LNG plant in Tangguh.



The scope of this job consisted of unloading and loading of three drier units as well as a new Mercury Removal Unit (MRU).

Faced with such a short duration to perform the whole change-out, CRAT prepared three sets of teams and equipment to execute the work as efficiently as possible. CR Asia's own innovative technologies were introduced to help increase efficiency even further. Such technologies included the automated four-drum tipper, CHEP bins and One-Way Packaging (OWP) bags. These innovations were designed to improve the efficiency and safety of catalyst unloading.

Overall, the job was completed safely and on time. The client was very grateful for CRAT's hard work, inventive approach and attention to safety.

CRAT EXECUTES PTTGC #4 TURNAROUND - CCR

By Callum Smith

CR Asia Thailand (CRAT) met new challenges in Rayong recently when its continuous catalytic regeneration (CCR) reactor specialists had to perform unplanned cutting and welding to fit internal parts.

CRAT was engaged to perform services for PTTGC 4's turnaround in May 2019, when the CCR reactor work became more complicated than expected. The new internal parts did not match or align with the original parts. CRAT's CCR specialists were able to perform unexpected cutting and welding to the internal parts to allow them to be assembled within the strict tolerances required.

Other work carried out during the turnaround included a full catalyst change-out with centre-pipe replacement on the CCR reactors. A full catalyst change-out and lifting of the regeneration tower on the regeneration unit and other maintenance works to the isomer unit and cyclohexane unit.

The job was well managed and executed to the client's satisfaction.



CRAT SPONSORS RUGBY EVENT TOURNAMENT

By Supanan Chokhengtrakool

In May 2019, CR Asia Thailand (CRAT) continued their long-standing sponsorship of the annual Chris Kays Memorial Rugby Tournament. Chris Kays was tragically killed in the 2002 Bali bombing while on a rugby tour with the Singapore Cricket Club. This 19th year of the popular tournament attracted clubs, players and visitors from all over Thailand and neighbouring countries along with the usual support of the locals and expats of the rugby community.

This year's event returned to its traditional venue of The Horseshoe Point Resort in Pattaya. Anticipating the hot day to come, CRAT contributed 24 tents to provide shade and cooling for participants and spectators alike.

Held over the first weekend in May, 16 teams competed over two days where defending champions Southerners Black triumphed once again.



CRAT RECEIVES RECOGNITION FROM IRPC

By Saeng Kaewkomol

CR Asia Thailand (CRAT) recently received special recognition from IRPC Public Company Limited for an outstanding performance during the March 2019 Shutdown of its Ethylbenzene Styrene Monomer (EBSM) plant in Rayong, Thailand. The catalyst replacement job was completed on time and without incident.

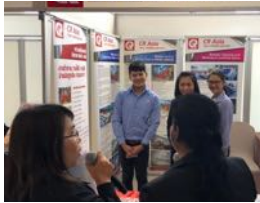
"We extend our thanks to everyone that was part of this team and helped execute a quality job safely and ahead of the planned duration."

We perform catalyst handling services in all types of reactors both onshore and offshore by our highly trained, service-oriented personnel. Our ability to offer a full suite of reactor services including closed circuit video inspection, cleaning of internals and all associated mechanical work in a 'blind to blind' approach reduces downtime and minimises cost.



CRAT JOINS SAFETY EVENT

By Khanuengnut Thumpharak



CR Asia Thailand (CRAT) participated in the 33rd National Occupational Safety and Health Fair held at the Golden City Rayong Hotel in May 2019.

CRAT is committed to providing a safe workplace and protecting its people from injury and illness. It invests in training programs, knowledge sharing, new processes and innovative technology to enhance its safety performance and minimise risks. This event was an opportunity to develop, exchange and learn about concepts and solutions for maintaining safety, peace and well being in the workplace.

CRAT AT POWER PLANT SEMINAR

By Nuchanart Lapasanoi



CR Asia Thailand (CRAT) introduces its factory maintenance technology at the 6th Annual Power Plant and Sugar Factory Seminar at Rachawadee Hotel in Khon Kaen Province, Thailand.

In June 2019, CRAT together with Siam Xenon joined five other companies to organise the seminar. Over 140 delegates attended CRAT's presentation on flange management and tank cleaning technology to achieve non man-entry using a remotely operated vehicle or robot. The audience was highly engaged with the presentation, which generated much interest.

It was a successful event and an excellent opportunity for CRAT to demonstrate their innovative maintenance solutions.



CRAT RECEIVES NATIONAL EXCELLENCE AWARD

By Nuchanart Lapasanoi

CR Asia Thailand (CRAT) is proud to receive a national excellence award from Thailand's Ministry of Labour. General Manager, Mr David Richardson accepted the award from the Permanent Secretary of the Ministry of Labor, Mr Suthee Sukosol.

The Thailand Labour Management Excellence Award ceremony was held in September 2019 at Impact Exhibition and Convention Center, Muang Thong Thani. These national awards are aimed to commend and honour companies who apply international standards to managing and caring for their workforce and who continuously improve employment conditions in the work place.

CONTINUALLY ENHANCING THE SAFETY, OCCUPATIONAL HEALTH & ENVIRONMENTAL WORKING PRACTICES FOR EMPLOYEES

CRAT's award was in recognition of their commitment and contribution to continually enhancing the safety, occupational health and environmental working practices for all employees.

CRAT has performed at the platinum level for ten consecutive years. Congratulations to CRAT for this outstanding achievement!



CRAT DECOKES FURNACES - THAI OIL

By Rung Sawangsri

CR Asia Thailand (CRAT) supported Thai Oil's shutdown during June and August 2019, by decoking seven furnaces.

CRAT's Pipeline Services team performed the decoking of seven furnaces while supporting the intelligent pigging inspection services carried out by Cokebusters – the customer's preferred provider for these ultrasonic inspections. The project was executed by operating two decoking machines continuously with the teams working 24 hours per day. The project was completed safely and within schedule.

CRAT's Project Engineers Patima Sanglao and Songkrand Paksi worked well together to manage and execute this project to the client's satisfaction. "Thai Oil appreciated the high quality of work we performed which was efficiently and safely executed."



CRAT RECEIVES CSR AWARD

By Nuchanart Lapasanoi

CR Asia Thailand (CRAT) is honoured and proud to be recognised for its continuous commitment to supporting the local community with its corporate social responsibility (CSR) efforts. The Ministry of Industry hosted its national CSR award ceremony on the 23rd September 2019 at the Miracle Grand Convention Hotel in Bangkok. CRAT was the recipient of the Department of Industrial Works (DIW) CSR award for the 11th consecutive year.

Companies nominated for the award were graded against the following seven criteria; organisational governance, human rights, labour practices, environment, fair operating practices, consumer issues and community involvement and development. Congratulations CRAT!

CRAT'S ANNUAL AUDIT

By Nurhuda Sengyee

CR Asia Thailand was successful in completing the annual surveillance audit in June 2019. The audit is conducted annually to confirm the integrated management systems covering quality, safety and environmental practices, are compliant to International Standards (ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018).

The audit was carried out by Bureau Veritas Certification Authority with the main focus being on the Provision of Mechanical & Industrial Services. This included Plant Maintenance, Turnarounds, Shutdown Management & Planning and Training Facilities (Safety, Technical & General).

The annual surveillance audit is an opportunity to review how we operate and consider ways to improve the safety and sustainability of our business.



CRAM WINS TA4MS TERM CONTRACT

By Munirah Hussin



CR Asia Malaysia (CRAM) secures a long-term contact with Petroliaam Nasional Bhd (Petronas) as part of the Master Service Agreement (MSA) for Integrated Turnaround Main Mechanical and Maintenance Mechanical Static (TA4MS) the Pengerang Integrated Complex (PIC).

Responsible for maintenance and turnaround activity, CRAM is proud to support Petronas' long-term efforts to empower local vendors, with this five-year contract with an extension option of three years plus two years.

With this award, CRAM is appointed as one of Petronas' Vendor Development Programme (VDP) anchor companies.

The VDP is an excellent platform for CR Asia to show its commitment to Petronas by extending its expertise and knowledge for local development. This relationship will be a catalyst to strengthen CRAM's influence in the Malaysia Oil & Gas market.

CRAM SECURES TERM CONTRACT WITH CPOC

By Munirah Hussin

In a move to streamline its floating production storage unit (FPSO) maintenance, Carigali-PTTEPI Operating Company (CPOC) awarded CR Asia Malaysia (CRAM) a catalyst repacking job on the mercury removal unit (MRU) at Tok Bali Supply Base (TBSB). TBSB serves the oil and gas industry in the offshore peninsular of Malaysia and the Gulf of Thailand.

CRAM will receive 1200 drums of spent catalyst per year to repack at the Tok Bali Supply Base. The scope of works includes removal of mercury from Chep Bin to drums and decontamination work.

With this two-year contract, CRAM expands its scope of service and expertise in handling mercury. It is an excellent platform for CR Asia to show its commitment to CPOC by extending our expertise and knowledge for local development. This relationship will bring opportunities for new projects.





CRAM SECURES TERM CONTRACT - ARDS

By Dean A. Wilson

CR Asia Malaysia (CRAM) is very proud to be awarded a three-year term contract (with an extension option of two years) by Pengerang Refining Company. The project includes periodic replacement of all catalysts and waste management of all spent material for the atmospheric resid de-sulphurization (ARDS) unit at the Pengerang Integrated Complex. This contract represents an important success for our Malaysia business and sets the foundation for securing more work at the Pengerang Integrated Complex - PETRONAS' largest Downstream investment in Malaysia.

PENGERANG INTEGRATED COMPLEX

The Pengerang Integrated Complex, also referred to as PIC, covers 6,239 acres and forms part of the larger Pengerang Integrated Petroleum Complex (PIPC) in Johor, Malaysia. Malaysia's oil and gas giant Petroliaam Nasional Berhad (PETRONAS) has invested USD27 billion in this project. It's designed to produce premium differentiated petrochemicals to meet domestic demand for petroleum products.



CRAM HARI RAYA & STAFF APPRECIATION DINNER

By Nurul Huda Musa

Each year CR Asia Malaysia (CRAM) invites staff and their family members to join a mass gathering to show appreciation for their hard work and loyalty to the company.

This year, the event was held in May 2019, to coincide with Hari Raya, an important religious festival celebrated by Muslims worldwide. It marks the end of Ramadan - the Islamic holy month of fasting. Dining at the De Rhu Beach Resort, CRAM staff and their family members enjoyed the social evening while breaking fast together. The gathering was also an opportunity for CRAM to give something back to the community by inviting a group of orphans from CAKNA KEMAMAN to join the dinner and receive a small donation.

CORPORATE SOCIAL RESPONSIBILITY

CAKNA KEMAMAN is an orphanage located on the eastern side of Peninsular Malaysia. Established in 2009, CAKNA KEMAMAN's mission is to equip orphans with the skills and knowledge to meet future challenges. Home to over 1,000 orphans, CAKNA KEMAMAN provides education to families in need. CRAM invited a group of children and volunteers from CAKNA KEMAMAN to join its annual appreciation dinner.

CRAM EXPANDS OPERATION TO PENDERANG

By Munirah Hussin

CR Asia Malaysia (CRAM) has opened a new Operations Centre in Pengerang to facilitate projects with Pengerang Refining and Petrochemical (PRefChem) – a joint venture between Petroliaam Nasional Berhad (PETRONAS) and Saudi Aramco.

The new branch office will be called the Pengerang Site Office (PSO) and is located at 583 PTD 806 Jalan Perindu 15, Kg Bukit Buloh, 81600 Pengerang, Johor. CR Asia has initially leased the three acres of land (with an option to buy if things go well) to accommodate an office building, chemical storage and operations and project equipment.

The PSO will also support CRAM's other two contracts in Pengerang awarded earlier in the year; a term contract for the atmospheric residue desulphurisation (ARDS)

unit catalyst change-out and spent catalysts management and the group-wide master service agreement (MSA) for integrated turnaround main mechanical and maintenance mechanical statics (TA4MS).

Work on the site started in mid-August 2019, and is due to be completed in November. As of 1st October, the major equipment is on site and the office cabins are in place.



CRAM AWARDED CTCI EURO V INITIAL LOADING AT RAPID

By Dean A. Wilson

CR Asia Malaysia (CRAM) is excited to support CTCI with the Euro V project at the Refinery and Refinery and Petrochemical Integrated Development (RAPID) in Pengerang, Malaysia.

CRAM staff attended the project kick-off meeting in early August 2019. The scope involves the initial loading of multiple reactors including the second stage hydro-desulfurisation (HDS) unit,



methanol guard pots, isomerisation reactors, sulfur guard beds and hydrogen dryers. The project is due to start in September.

CTCI is a renowned leader in reliable engineering services across Asia, the Middle East and the Americas. Malaysia's oil & gas giant Petroliaam Nasional Berhad (PETRONAS) recently honoured

CTCI for outstanding execution of RAPID Package 1 Residue Fluid Catalytic Cracker (RFCC) Project for the Pengerang Integrated Complex. PETRONAS' RAPID site in the southern state of Johor Malaysia, will consist of a 300,000 barrel per day refinery and petrochemical complex with combined annual chemical output capacity of 7.7 million metric tonnes.

FOCUS ON SINGAPORE

CRAS - CUSTOMER SATISFACTION

CR Asia Singapore (CRAS) received excellent customer satisfaction ratings in June 2019. Executing six projects for Shell Seraya and ExxonMobil, they averaged a score of 94.7%. Outstanding!

WHAT THIS MEANS

Clients receive a customer satisfaction survey to complete after each job. The survey assesses CR Asia's performance for criteria such as quality of service, communication, reporting, safety management and more. Questions are designed to present different aspects of the organisation (products/services, equipment, safety, environment and staff) in order to measure customer satisfaction and perception. CRAS performed exceptionally for each of these criteria, earning them the 95% rating.



CRAS PERFORMS BACK-TO-BACK CLAY & SALT REPLACEMENTS

By Stephen Lindsay

CR Asia Singapore (CRAS) performed back-to-back clay and salt replacements on three Merox units at the ExxonMobil Jurong Refinery. These units are a regular maintenance item and are normally changed out twice yearly. However, due to an operational issue, they needed servicing outside of the planned maintenance

schedule. The CRAS crews mobilised quickly and worked seamlessly in co-operation with the ExxonMobil First-Line Supervisors to complete the projects on schedule. The job was made challenging due to hard salt product. However, the three units were completed safely, ahead of schedule and with commendations from the client.

CRAS AWARDED TERM CONTRACT BY ENI PAKISTAN

By Dean A. Wilson



CR Asia Singapore (CRAS) is proud to be awarded the 3-year contract (with an extension option of one year) by Eni

Pakistan, for mercury bed change-outs. CRAS will perform the replacement of adsorbent from up to five reactors multiple times over the course of the contract duration. Located southeast of the Bhit Gas Field, within the Sindh province in Pakistan, Eni's gas plant is approximately 250 kilometres northeast of Karachi. The largest foreign gas producer in Pakistan, Eni is committed to supporting sustainable development in Pakistan, through significant community development initiatives.

PT ECOGREEN OLEOCHEMICALS

By Dean A. Wilson

CR Asia Singapore (CRAS) completed a catalyst change-out in July for PT Ecogreen Oleochemicals in Batam, Indonesia. One of the world's leading producers of Natural Fatty Alcohols. The scope included the catalyst change-out of the four-bed alcohol reactor and the de-tensioning of the top reactor inlet spool.

During the change-out, the crew discovered that the stud bolts were custom made. They had to improvise, substituting the tensioning gear with torqueing equipment to unbolt the studs. Faced with inert and caustic conditions due to the presence of liquid fatty alcohols, the highly trained crew was equipped with appropriate personal protective equipment and able to enter the reactor safely. With great initiative and the cooperation of a hard-working team, CRAS executed the change-out successfully, ensuring safety was not compromised.



CRAS CONDUCTS WORKSHOPS FOR PERTAMINA

By Kellie Timko

CR Asia Singapore (CRAS) with support from PT Giant Sumarindo travelled through Indonesia in September with technical partners ZymeFlow Decon Technology and Cokebusters. Together, we conducted a series of workshops for PT Pertamina (Persero) - Indonesia's largest state-owned enterprise and the second-largest producer of crude oil in Indonesia.

Pertamina employees from Plaju, Balongan and Dumai refineries attended the sessions that introduced innovations improving the safety and efficiency of maintenance solutions in the refining industry. The agenda included CR Asia's own developments such as Advanced Wet Dumping, CR Asia Decoking Technology (CDT), the 4-drum automated drum tipper, Soft-Flow loading system, CR Asia Dense Loader and of course its catalyst handling remotely operated vehicle called 'Rover'.

ZymeFlow introduced their decontamination technology that improves turnaround efficiency with safe vessel entry in 8-12 hours. A faster and safer entry compared to conventional techniques. Cokebusters introduced their Merlin Inspection Technology. Using ultrasound technology for the in-line inspection of furnace tubes to identify material loss and creep damage is the only true way of assessing the remaining life of the tubes after mechanical decoking.

The Pertamina crowd was certainly interested in the solutions we offered and gave positive feedback.

CR Asia and partners are known for delivering excellent customer service across a wide variety of industry sectors throughout Asia. Our employees have a proven track record for ensuring our clients have a bespoke and tailored solution, which is cost-effective, efficient and takes quality standards to new levels. We utilise our significant technical depth to ensure we never compromise on safety, service, capability or delivery, irrespective of the size of the project.

CRAS JOINS FORCES WITH ANABEEB

By Elvin Low

CR Asia Singapore was invited by Anabeeb to help plan and execute a large mechanical decoking and inspection project for Saudi Aramco refinery at Yanbu during its March 2019 shutdown.

The month-long shutdown included decoking work performed by Anabeeb together with CR Asia while the intelligent pigging was performed by a specialist inspection contractor.

"The client was delighted with our decoking work! We were able to clean their furnaces quickly and efficiently with superior execution."

A total of eight furnaces were mechanically decoked and inspected using ultrasonic (UT) intelligent pigging tools.

The initial scope of six furnaces was modified to eight midway through the shutdown when the client, Saudi Aramco, added two more furnaces for mechanical decoking only. Anabeeb, with CR Asia's support, was able to mobilise additional piggs on time for the cleaning. Decoking activities for these two extra furnaces were completed swiftly without impacting the overall schedule.

CR Asia Singapore appreciates Anabeeb's decoking specialists and mechanical crews for their excellent work and their dedication to making this job a success.



CRAS CELEBRATES HARI RAYA PUASA

By Elsie Low



CR Asia Singapore (CRAS) celebrates Hari Raya Puasa - an important religious festival celebrated by Muslims worldwide. It marks the end of Ramadan, the Islamic holy month of fasting. CRAS celebrated with a staff lunch in June 2019.

CRAS is a company that embraces diversity. Our employees represent numerous nationalities including Filipinos, Indians, British, Myanmar, South Africans and a Kiwi. We all came together to celebrate this festive day.

This gathering was also an opportunity to celebrate our safety award for the catalyst change-out at Shell Seraya. General Manager, Edwina Wong handed out certificates and congratulated the team for their success.



CRAS DECOKING FOR EXXONMOBIL

By Jayakumar Arumugam

CR Asia Singapore (CRAS) carried out the decoking activity for a heater at ExxonMobil's Singapore Aromatics Refinery 1 (SAR 1) in July 2019.

The heater consisted of five passes. CRAS used two pigging units running concurrently, which enabled multiple passes to be cleaned at the same time, significantly reducing downtime.

CR Asia's Decoking Technology (CDT) uses water at near ambient temperature and low pressure, typically 150 psi, to drive a special type of pig along the tube so that all the coke and scale is scraped clean from the tube wall. As these deposits impact operational efficiencies, it is important to clean the tubes thoroughly, quickly and safely.

CRAS had to ensure there was no spillage of contaminated water during opening of the pig launcher. Due to space constraints, typical collection trays could not be used. Therefore, CRAS custom made a device to collect all of the contaminated water and transfer it to the holding tank.

The job was executed safely and within schedule.

CRAS DECOKES COMMON HEADER HEATER

By Jayakumar Arumugam

CR Asia Singapore (CRAS) used a Common Header Delivery System to mechanically clean three common header heaters at ExxonMobil's Pulau Ayer Chawan (PAC) refinery.

Most of these heaters are not piggable because of their design, as the pipes are inaccessible. Mechanical pigging requires a closed loop system so that bi-directional cleaning can be achieved. However, by using a Common Header Delivery System, the three common headers could be accessed and decoked without having to cut any pipes or remove the flanges.

A NOTABLE ACHIEVEMENT

All ten passes on the three different sized heaters were decoked safely and on schedule. It was a notable achievement for CRAS as it was the first time the team had encountered a ten-pass configuration.

CRAS ATTENDS ZYMEFLOW LICENSEE SUMMIT

By Dean A. Wilson

CR Asia Singapore (CRAS) and CR Asia Malaysia (CRAM) attended ZymeFlow Decon Technology's licensee summit held in August 2019 at the Shangri-la Hotel Singapore.

ZymeFlow Decon Technology and CR Asia are leaders in refinery and petrochemical process equipment decontamination for entry, inspection and maintenance including hot work. The exclusive ZymeFlow process uses proprietary chemistry and applications to achieve vessel entry in 8-12 hours. This unparalleled process prepares equipment for entry by simultaneously de-oiling while eliminating pyrophoric iron sulfide (FeS), hydrogen sulfide (H₂S), benzene, and other explosive gases (LELs).

REDUCING TOTAL TURNAROUND TIME THROUGH INNOVATIVE DECONTAMINATION AND CLEANING TECHNIQUES

In collaboration with ZymeFlow, CRAS hosted a client workshop prior to the licensee seminar. It was an excellent opportunity to demonstrate how this partnership can help reduce total turnaround time through innovative decontamination and cleaning techniques. The workshop agenda included bottom of the barrel cleaning, heat exchanger cleaning and reactor services. Over 40 representatives from clients in Singapore and neighbouring countries attended the event, with a large number reporting that they learnt something new and that it was a good use of their time.



CRAS - PERSONAL DATA PROTECTION

By Elsie Low



CR Asia Singapore's (CRAS's) Human Resource Department recently trained its employees on the Personal Data Protection Act (PDPA). PDPA came into effect in 2014 to govern the collection, use and disclosure of personal data by organisations. It recognises both the right of individuals to protect their personal data and the needs of organisations to collect, use or disclose personal data for reasonable and legitimate purposes.

According to the Personal Data Protection Commission of Singapore, personal data (PD) refers to data that identifies an individual to which an organization is likely to have access. Such as name, address, telephone number and identity number.

There have been numerous changes to the PDPA since 2014. The most recent enforcement will be for companies to appoint a Data Protection Officer (DPO). CRAS has appointed Elsie Low, Human Resources Manager as its DPO.

When CRAS collects PD, it must ensure it is not collecting excessive personal data and is not allowed to collect, use or disclose identity numbers except where it is required under the law.

CRAS has implemented policies and practices to meet its obligations and comply with the PDPA.

CRAS AND EXXONMOBIL COLLABORATE

By Dean A. Wilson

ExxonMobil (EM) Buddy Manager, Chin Yit Siang, visited CR Asia Singapore (CRAS) in June to discuss EM's standards in health, safety and environment (HSE).

As an EM appointed contractor, CRAS must align its HSE standards with EM policies and business objectives. The 'Buddy Manager System' is one good practice that is being rolled out across EM's operations for enhancing the company-supplier relationship. Each primary supplier is assigned an ExxonMobil Buddy, who acts as a mentor, helping the organization set performance objectives.

Buddies provide advice and guidance and help suppliers build accountability with EM. This program encourages collaboration on safety issues, helps improve performance and fosters innovation.



CRAS RECEIVES SAFETY RECOGNITION

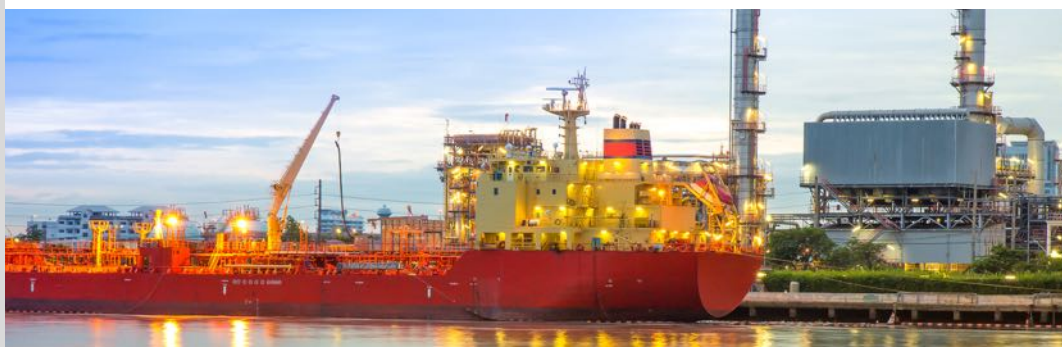
By Anandh Shanmugam

Safety workers from CR Asia Singapore's (CRAS's) catalyst handling crews received recognition from Shell Bukom for their continuous efforts in actively pursuing safety excellence during the hydrodesulfurization (HDS)-5 turnaround.

Shell Bukom is an integrated oil and petrochemicals site with manufacturing facilities for fuels, lubricant base oils and specialty chemicals.

The turnaround involved the full catalyst replacement on a three (3) bed HDS reactor. The job was completed safely and on schedule.

Edwina Wong, General Manager and Rudo Steyn, Catalyst Handling Division Manager visited the site and praised the team for their outstanding work. Shell was very impressed with the site setup. Rudo said; "The banner on the vessel and the overall neatness of the working area was impressive. The Shell TA Manager only had good things to say about our staff. Well done team Bukom!"



CRAS - REFINING & PETROCHEMICALS WORLD CONFERENCE

By Dean A. Wilson

CR Asia Singapore attended the Refining and Petrochemicals World Conference in Bali, Indonesia.

Held in May 2019, the meeting provided an excellent way to learn more about the upcoming expansion plans in the refining and petrochemicals sector in Indonesia.

The conference offered some great insights into Indonesia's downstream oil and gas industry. It was well attended and presented a great opportunity to meet with representatives from all over the region.



CRAI AWARDED DECOKING TERM CONTRACT FOR IOCL

By Gunavel Rathinam

CR Asia India (CRAI) is pleased to announce it has recently been awarded a 2-year term contract for the decoking of fired heater tubes at Indian Oil's Panipat Refinery in the North-West of India. CR Asia has its own proprietary CR Asia Decoking Technology (CDT) to remove coke that builds up in furnace and fired heater tubes during normal operation. CDT is safer, quicker and more environmentally friendly than conventional methods such as steam-air decoking and enables the integrity of the tubes to be checked through advanced inspection techniques.

CDT is normally used to clean furnace and fired heater tubes in a number of process units including Delayed Coking, Residual Desulphurization, Visbreaking and Cogeneration Units plus Vacuum Heaters, Naphtha Heaters and Crude Heaters.

The addition of this term contract means that CRAI now has seven separate decoking term contracts in India, which is an outstanding accomplishment.

CRAI - NEW TRAINING AND SERVICE CENTRE

By Gunavel Rathinam



CR Asia India (CRAI) has invested in a new service centre and state-of-the-art technical training facility in Jamnagar to cater to the growing needs of its customers. The new service centre is ready and will open soon.

Five times larger than the existing yard, the new facility prepares CRAI for its projected growth. It includes a workshop for maintenance and fabrication and a training centre for boosting the skills of internal and external participants.



CRAI COMPLETES TURNAROUND AHEAD OF SCHEDULE

By Prakash Shetty

CR Asia India (CRAI) completed a turnaround project during April and May 2019 at ONGC Mangalore Petrochemicals Ltd, Asia's largest producer of paraxylene and xylene. Despite it being an extremely busy period for the business, with multiple jobs being coordinated at the same time, CRAI successfully completed the project well ahead of the planned schedule.

The scope covered all major equipment including vessels, drums, reactors, columns and heat exchangers of all types. Additional scopes were identified during the execution phase, which were scheduled and completed alongside the pre-determined jobs. Such work included a benzene column overhaul, CCR scallop repair/replacement and other general maintenance tasks.

The entire project was completed five (5) full days ahead of schedule. Overall, the project was well planned, well managed and a huge success and the client immensely appreciated being able to re-start their plant earlier than expected.



CRAI REPAIRS AMMONIA CONVERTER

By Jagajjeevan Shetty

CR Asia India (CRAI) was called upon to execute repair jobs on an ammonia converter outlet line that had developed a crack during operation. The scope involved weld repairs on the internals of the container under inert atmospheric conditions. Due to the operational status of upstream/downstream equipment, the line could not be isolated increasing the risks significantly. However, the client was successful in ensuring zero hydrogen levels inside the converter so that CRAI could proceed with the repair. The job required the simultaneous entry of two personnel using breathing apparatus.

The core jobs executed during the repair work included cutting of retainer strip, replacement of ceramic packing and welding the retainer strip back into position. It was a great relief to the client since the need for a full shutdown was eliminated owing to CRAI mobilising and successfully executing the project in a short duration.



**1,275,097
SAFE WORKING HOURS**



CRAI - COMPREHENSIVE MAINTENANCE CONTRACT

By Nagendra Rao K

CR Asia India (CRAI) has completed 30 months of its five-year comprehensive maintenance contract (CMC) with the world's largest grassroots refinery located in India. CRAI provides daily plant maintenance services to 15 units within the refinery in Jamnagar. Recently, as part of the refinery expansion, two more units were added to CRAI's CMC – a high purity isobutylene unit (HPIB) and a seawater reverse osmosis (SWRO) unit. With these two new units, CRAI now maintains a total of 17 units as part of this contract.

Since the beginning of this year, CRAI has completed 20 shutdowns and turnarounds within the refinery, including an emergency slowdown of the fluid catalytic cracking (FCC) unit. The FCC unit required a complete overhaul of the north power recovery train (PRT) due to high vibration.

CRAI achieved an outstanding 1,275,097 safe working hours for these 20 shutdowns and turnarounds. All events were completed within schedule and without incident. A great achievement by all involved!

CRAI is currently planning the upcoming shutdowns of the sulphur recovery unit (SRU) along with the hydrotreater and polypropylene units.

WORLD'S LARGEST REFINERY

CRAI-CMC TURNAROUNDS AND SHUTDOWNS

By Nagendra Rao K

During June and July 2019, CR Asia India (CRAI) completed two turnarounds and two shutdowns as part of the continuous maintenance contract (CMC) at the world's largest refinery in India.

The crude distillation unit and coke drum replacement projects were the most significant of the events executed during this time. With a workforce of over 1,000, multi-discipline teams worked around the clock to complete all of the work within schedule. Overall, the scopes covered all major static and rotating equipment including vessels, drums, reactors, columns, pumps, compressors and heat exchangers of all types.

CRAI achieved an outstanding 510,584 safe working hours during these 2 months alone.

CRAI experienced an extremely busy period coordinating multiple jobs at the same time. The Turnarounds and Shutdowns team is proud to have finished several more significant events within schedule, with zero incidents and to have achieved a leak-free start-up in each case.

We would like to express our deepest gratitude to all stakeholders, including the client who contributed to these successful outcomes.

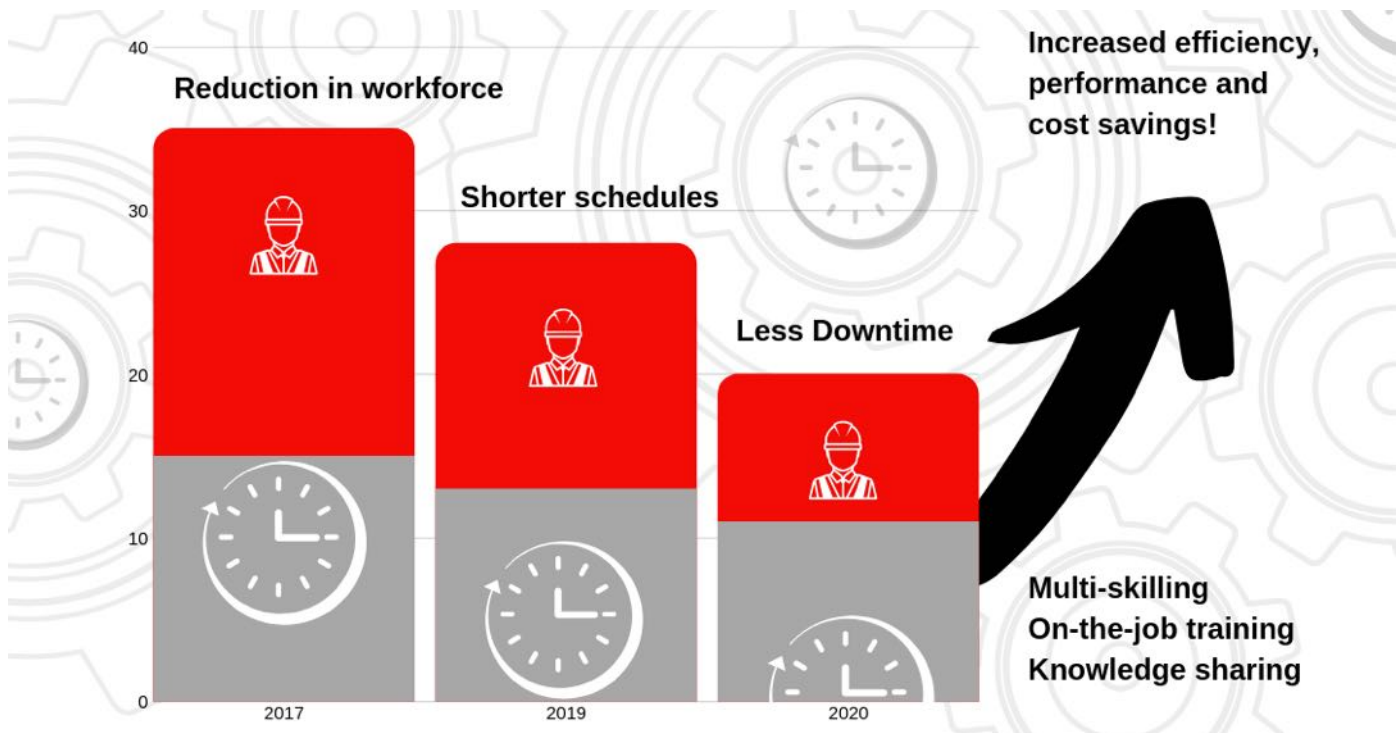
CRAI COMPREHENSIVE MAINTENANCE CONTRACT MAINTAINING THE CAPTIVE POWER PLANT

By Arun Ghosh

MULTI-SKILLING AND ON-THE-JOB TRAINING ARE ENHANCING CREWS RESULTING IN BETTER PERFORMANCE, INCREASED EFFICIENCY AND REDUCTIONS IN WORKFORCE AND SCHEDULE.

CR Asia India (CRAI) is responsible for keeping the lights on at the captive power plant as part of the comprehensive maintenance contract (CMC) for the world's largest refinery in Western India. The 635 MW plant consists of 11 gas turbines of 30 MW capacity each, one gas turbine of 125 MW capacity and six steam turbine generators of 30 MW capacity each. CRAI-CMC maintains these turbines and the associated heat recovery steam generators (HRSG) and auxiliary boilers within the plant to strict standards as specified by the Indian Boiler Regulations (IBR).

At the beginning of the contract, CRAI-CMC had 35 staff on site for 15 days to carry out the required IBR scheduled maintenance activities. However, by improving the productivity of its workforce, CRAI-CMC is executing the same services with just 28 staff over 13 days. This number is expected to gradually reduce further through multi-skilling and on-the-job training. With the enhanced crews and detailed planning of the jobs, CRAI-CMC expects to execute the same services with just 20 staff over 11 days.



CRAI EXECUTES SHUTDOWN AT WORLD'S LARGEST REFINERY - AROMATICS PLANT

By Arthur Jacobs

AROMATICS SHUTDOWN

HSE STATISTICS

230,416

MAN-HOURS

CR Asia's mechanical scope was significant and required a large workforce that peaked at over 1,000 during the busiest period.

TOOLBOX TALKS

Conducted prior to each shift, crews lined up for dayshift and nightshift operations to hear the safety discussion of the day.

1,786

229

OBSERVATIONS

Strict monitoring of safety regulations took place over the course of the project documenting hazards as well as safety commendations.

LOST-TIME INCIDENTS

A diligent and well trained team ensured a successful and incident free project. Zero lost-time incidents! Zero first aid cases!

ZERO

ZERO

NEAR MISSES

Pre-shutdown planning, on-site training and a well developed risk assessment all helped to prepare the workforce for the job at hand and prevent injury. Zero near misses!

CR Asia India (CRAI) was engaged in a significant shutdown at the world's largest refinery during April and May 2019. After weeks of preparations, pre-shutdown activities, discussions with our client and subcontractors, we were ready to commence the project on the day the client stopped the hydrocarbon feed into the plant. Our crews were lined up for dayshift and nightshift operations and started to blind all battery limit valves to isolate the plant from the live refinery. Once the site was isolated, the client began to decontaminate and steam out the plant for a safe handover to all contractors to begin their mechanical activities.

CRAI's mechanical scope was significant and included the following key activities:

- Blinding / de-blinding
- Scaffolding
- Insulation: lagging and cladding
- End to end heat exchanger maintenance including retubing of bundles
- Fin Fan plug opening, hydro-jetting
- Vessel and column maintenance
- Valve dropping, repair, machining, box-up
- Hot works and fabrication
- Hydro-testing after box-up of equipment
- Bolt torquing
- Motor removal and installation

This multitude of activities required a large workforce that peaked at just over 1,000 during the busiest period. More importantly and thanks to a great team effort, we achieved an impressive 230,416 man-hours without incident. Our client praised this performance in a motivational program meeting. Also, the Vice President for Site Safety recognised CR Asia's safety team for maintaining the HSE culture and safe systems of work compliance throughout this and other shutdowns at the plant.

On behalf of the Shutdown management team, we are proud to have finished another large event within schedule, with zero incidents and to have achieved a leak-free start-up. We want to express our deepest gratitude to all personnel involved and for making this project a huge success.

CRAI PROMOTES A CLEAN WORKPLACE

By Kevin Vas

When first impressions count, a clean and tidy workplace will look appealing and welcoming. But maintaining a clean work environment is important for many reasons. It helps keep staff members safe and healthy, it influences performance and productivity and improves efficiency.

CR Asia India (CRAI) teamed up with the Mangalore City Corporation to raise awareness of cleanliness in and around the workplace. Employees spent half a day clearing debris and waste from in and around the Mangalore yard, parking lot and garden area.

Ramakrishna Mission - a NGO currently working on its Clean City mission, conducted a compost presentation to all Mangalore yard employees. They explained the different kinds of waste and how each is generated. Then demonstrated how to separate daily waste and convert the wet waste into compost – a natural decomposition of organic materials by microscopic organisms. By using a composting clay pot at home, everyone can turn their wet waste into nutrient-rich fertiliser for the garden.

CRAI is committed to maintaining a clean and safe workplace. A Clean Yard Team has been formed to monitor cleanliness and identify areas that need attention. Furthermore, each week, teams are allocated a specific area of the yard to clean.

CRAI-CMC SETS A NEW BENCHMARK - SCAFFOLDING

By Arun Ghosh

CR Asia India's Comprehensive Maintenance Contract (CRAI-CMC) sets a new benchmark at the world's largest refinery located in India.

CRAI-CMC was awarded the job of erecting internal scaffolding inside the vacuum gas oil (VGO) unit heaters. The scope included the erection and removal of 5,521 cubic metres of scaffolding in two large heaters. It was an especially challenging job due to the aggressive schedule and hot working conditions that continued throughout the duration of the project. However, as a result of rigorous planning and preparations, the dedicated team completed the work ahead of schedule and without incident.



CRAI SECURES CATALYST CHANGE-OUT TERM CONTRACT

By Gunavel Rathinam

CR Asia India (CRAI) has recently secured a one-year catalyst change-out term contract for HPCL-Mittal Energy Limited (HMEL) at their Guru Gobind Singh Refinery in Bathinda. CRAI's scope involves the replacement of a wide range of catalysts across multiple types of reactor throughout the refinery. This marks CRAI's 3rd catalyst related term contract in India and further emphasises CRAI's strength and depth in this critical discipline.

CR Asia has the largest fleet of catalyst handling equipment and numbers of catalyst technicians in Asia. In addition, we set the benchmark for quality, safety and schedule for catalyst replacement in a number of complex reactors and is why CR Asia is often regarded as Asia's leading catalyst handling expert.

EO REACTOR CATALYST REPLACEMENT JOB

By Kiran Shetty



CR Asia India (CRAI) completed an ethylene oxide (EO) catalyst replacement job in April 2019 for a prominent petrochemical manufacturing facility in Western India. CRAI was awarded this project based on their previous experience and superior execution of other similar work performed for this client.

The job was made more challenging by the fact there were approximately 1,600 tubes within the reactor that contained fused catalyst, which was suspected to be due to an operational issue and plant trip that happened in December 2018. Nevertheless, with the right equipment and a committed effort from the CRAI team, this job was carried out safely and to the satisfaction of the client. The most critical task was grit blasting of all tubes inside a confined space.

Overall, a successful project executed safely.



PAREX TRAIN 3 ADSORBENT REPLACEMENT

By Jagajjeevan Shetty

A diverse team led by Stefan Breet delivered another successful Parex reload at the world's largest refinery in Jamnagar, India. A joint team from CR Asia India (CRAI) and CR Asia Thailand (CRAT) completed the project ahead of schedule, despite the challenging duration planned.

With growing domestic demand for paraxylene due to its role in the manufacture of polyester, placing the unit back into operation was of utmost priority. The teams from CRAI and CRAT worked collaboratively with all stakeholders, including the client and licensor to ensure a very successful and incident free project, which was completed comfortably ahead of schedule.

The execution team understood the importance of this project and displayed a high degree of professionalism in completing it without interruption. The client has always been the frontrunner in terms of Parex shutdown jobs. Their comprehensive planning and involvement in executing jobs, requires they have a stringent monitoring team in place at all times. It is a significant achievement by the team to have surpassed the client's expectations in all areas. All previous Parex reloads at this refinery have established benchmarks and this latest one increased the bar even higher.

CRAI ANNUAL TRAINING PROGRAM

By Pramukh Poojary

CR Asia conducts regular safety training to ensure a safe working environment for its people. In June 2019, CR Asia India (CRAI) invited guest trainers and other specialists to its Mangalore yard to conduct this year's annual training program. A three-week event, offering 22 different classes for the 230 personnel who attended.

A breathing apparatus (BA) refresher course was one of the first classes on the program. It incorporated a practical demonstration of how to set up BA equipment and what techniques can be used in the field for safe and better execution. BA rescue training was also covered. Safety specialists carried out practical training using a twin line system with two anchor points. Other topics included were the use of automated electronic defibrillators (AED), confined space safety practices and the FAST method of identifying someone having a stroke - Facial drooping, Arm weakness, Speech difficulties, Time to call emergency services.

CR ASIA IS COMMITTED TO PROVIDING A SAFE WORKPLACE FOR ALL

Other courses conducted during the event included first aid training, toxic gas detection, fire-fighting and near misses along with the importance of reporting them. Safety specialists conducted courses on working in confined spaces and working from heights, while health specialists from local clinics covered topics such as general health, cancer awareness and the importance of drinking good quality water.

The program concluded with a knowledge sharing session on new products available in the market.

CR Asia is committed to providing a safe workplace for all and continues to invest in training programs, knowledge sharing, processes and equipment that enhances safety and minimises risks.



A MESSAGE FROM THE GROUP SAFETY MANAGER

By Pete Cheshire

This year has continued to be a very busy year across the CR Asia area of operations. In many locations, our people are going from one turnaround to the next on a continuous basis. We need to be monitoring our staff fatigue management plans to ensure our staff are happy, safe and well.

It is currently monsoon season in most of CR Asia's locations and this creates new hazards. Especially in chemical and petrochemical plants, due to excess water inhibiting the safe drainage of residual product away from the plant area. Extra care should be taken to avoid working in product contaminated areas. Stringent precautions should be maintained and extra attention to detail given when planning any hot work. The wet conditions also amplify slip, trip and fall hazards. Look out for hazards such as wet stairways, platforms and wet and oily conditions underfoot.

As always, we must continue to follow verbal instructions, safety procedures, safe work instructions, hazard controls and client's workplace permit stipulations. If you don't know or are unsure if a situation is safe, ask! We are all responsible for the safety and wellbeing of ourselves and our colleagues. Our ability to constantly maintain a Zero Harm workplace needs everyone's support! We are all responsible for staying focused on maintaining CR Asia as a Zero Harm company.

Work hard, play hard and above all, stay safe.



CUSTOMER EXCELLENCE AWARD - EPICOR

By Jacques Smits

CR Asia Group started the implementation of Epicor in April 2019. Epicor is an enterprise resource planning (ERP) system required to ensure an appropriate level of management and operational control of projects is maintained. Especially during this period of increasing number, size and complexity of projects across all CR Asia Group companies. CR Asia

Thailand (CRAT) is the first company to implement Epicor. CR Asia India (CRAI) will follow in 2019 while CR Asia Singapore (CRAS) and CR Asia Malaysia (CRAM) will implement Epicor in 2020. CRAT went "live" with Epicor on 1 May 2019

Epicor is a cloud-based system that gives access to information from anywhere in our region, be it on a job site or in the offices. All managers will be able to access reliable project data – faster. CR Asia expects Epicor will improve the quality of its management information and decision-making

processes. It will also make the reservation of labour and equipment for future projects possible, integrating separate processes into one system and therefore reducing the need for the existing independent sub-systems. These will be phased out over time.

LATEST TECHNOLOGY FROM EPICOR

Operational in CRAT, the team is adjusting to the new system. Overall, it functions as intended. A notable achievement for both CR Asia Group and Epicor Software, as it was a complex implementation using the latest available technology by Epicor. Hence the nomination for the "Epicor Customer Excellence Award for Cloud Deployment" in Kuala Lumpur on 9 July. On behalf of CRAT, ICT manager Anuchet Kabcrua received the award and the prize – a S\$500 donation to a local school in the Rayong area for school uniforms.

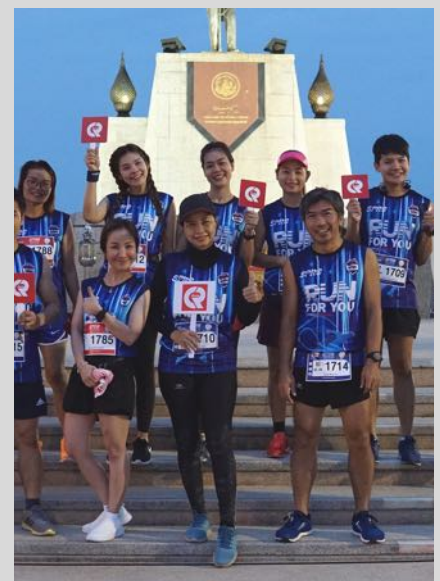
CRAT JOINS SPRC'S RUN FOR YOU

By Nuchanart Lapasanoi

CR Asia Thailand (CRAT) continued its long-standing relationship with Star Petroleum Refining Public Company Limited (SPRC) by supporting this year's SPRC Run for You – a charity mini-marathon race for the Royal Trophy bestowed by Her Royal Highness Princess Maha Chakri Sirindhorn. CRAT was well represented with 80 employees participating in the event - held for a third consecutive year at Royal Thai Naval Air

Division, Rayong.

SPRC is an oil refinery in the Rayong Province of Thailand. SPRC aims to promote a healthy lifestyle and physical exercise. Committed to contributing to the social welfare of the Thai society, proceeds from this event were donated to hospitals in the eastern region to provide medical supplies and equipment.



CRAT JOINS 19TH ANNUAL CUEL CHARITY CLASSIC

By Glenn Ebert



CUEL Limited hosted its annual golf tournament in September. The 19th Annual CUEL Charity Classic was a great success with a field of 264 golfers raising 1,515,000 baht for the nominated charity - The Fountain of Life Centre. The centre provides care and education for abandoned and impoverished children in need. "A truly a great charity."

CR Asia Thailand partnered with Thunder Oil Field Services to sponsor the drinks kiosk at the event. They were highly praised for providing a spectacular station where music was playing and everyone could enjoy a variety of drinks as well as a selection of excellent Louisiana Style Cajun food.

CRAS OHS SYSTEM TRAINING

By Elsie Low

CR Asia Singapore (CRAS) conducted an in-house training session on the new Occupational Health and Safety Management systems certification.

CR Asia's Corporate Quality and Performance Manager Mr Dinesh Deogire, visited CRAS in September 2019 to advise and communicate the changes to the system with the recent replacement of the international standard OHSAS 18001:2007 with ISO 45001:2018. The new standard was developed by a committee of occupational health and safety experts and follows other generic management system approaches such as ISO 14001 and ISO 9001.

Dinesh also briefed the team about the audit process and how to ensure compliance with safety standards.

CRAS - HUNGRY GHOST FESTIVAL

By Elsie Low



The Hungry Ghost Festival, a traditional Buddhist and Taoist festival held in certain Asian countries, falls on the 15th day of the 7th month of the lunar calendar. During this 7th month, it is believed that spirits return from the afterlife to feast. It's a time to honour ancestors and relatives by making offerings of food, joss sticks, candles, paper money and other such gifts to wandering souls that roam the earth. CR Asia Singapore celebrated this festival together on 15 August hosting lunch for the entire team. Group Managing Director, Mark Stansfield joined us for the occasion as the team made offerings to the roaming souls.

WARIT INTARAGUMHANG



Mr Warit Intaragumhang (วริศ อินทร์กำแหง), a Chemical Engineer from Khonkaen University joined CR Asia Thailand (CRAT) in July 2019 as Business Development Manager.

Warit's vast experience includes technical, operations, sales, business development and senior management roles having over 19 years' experience with international companies such as General Electric (GE) Thailand and Hager+Elsasser (H+E). His most recent role being the Regional Sales Director – Asia Pacific for Hager+Elsasser (H+E). "I'm very excited to join CRAT as it is a good challenge for my career. It is also great to have the chance to work with all our experienced operations crews, management and staff in every division."

MUNIRAH HUSSIN



Munirah Hussin recently joined CR Asia Malaysia (CRAM) as the Business Development Manager. She has proven experience in sales and marketing for Malaysia Oil & Gas for both

upstream and downstream. Munirah is responsible for creating new opportunities to diversify the existing business model and identify potential growth for core business strength. The goal of the role is to drive sustainable financial growth through boosting sales and forging strong relationships with clients. Munirah reports to the CRAM General Manager, Group Business Development Manager and CRAM Business Unit Manager for different activities respectively. "I am really excited to join this company and can't wait to start contributing my part."

JAYAKUMAR ARUMUGAM



CR Asia Singapore (CRAS) welcomes Jayakumar Arumugam to the team. Known as Jaya by his colleagues, he joined CRAS in early May as the CR Asia Decoking Technology (CDT) Division

Manager. Jaya has vast international experience in the oil and gas industry and previously worked for CR Asia India in the '90s. After which he left and joined DDT (Australia). He has relevant working experience in CR Asia's Decoking Technology (CDT), pigging works as well as high-pressure water jetting. He's also a qualified workplace, safety and health officer as well as a certified trainer.

LAURA KOK YOKE LENG



Laura Kok Yoke Leng joined CR Asia Singapore as an administrative assistant in June 2019. Laura reports to Ms Amelia Wong. She comes to us with extensive work experience having worked

for her previous employer for 20 years. Laura enjoys travelling and cooking, especially for her family. She also likes to express her creativity by making jewellery in her spare time.

JAGADEESAN NANDHAKUMAR



Jagadeesan Nandhakumar (known by friends and colleagues as Kumar) is a highly qualified Health, Safety and Environment (HSE) Coordinator. He joined CR Asia Singapore in August and

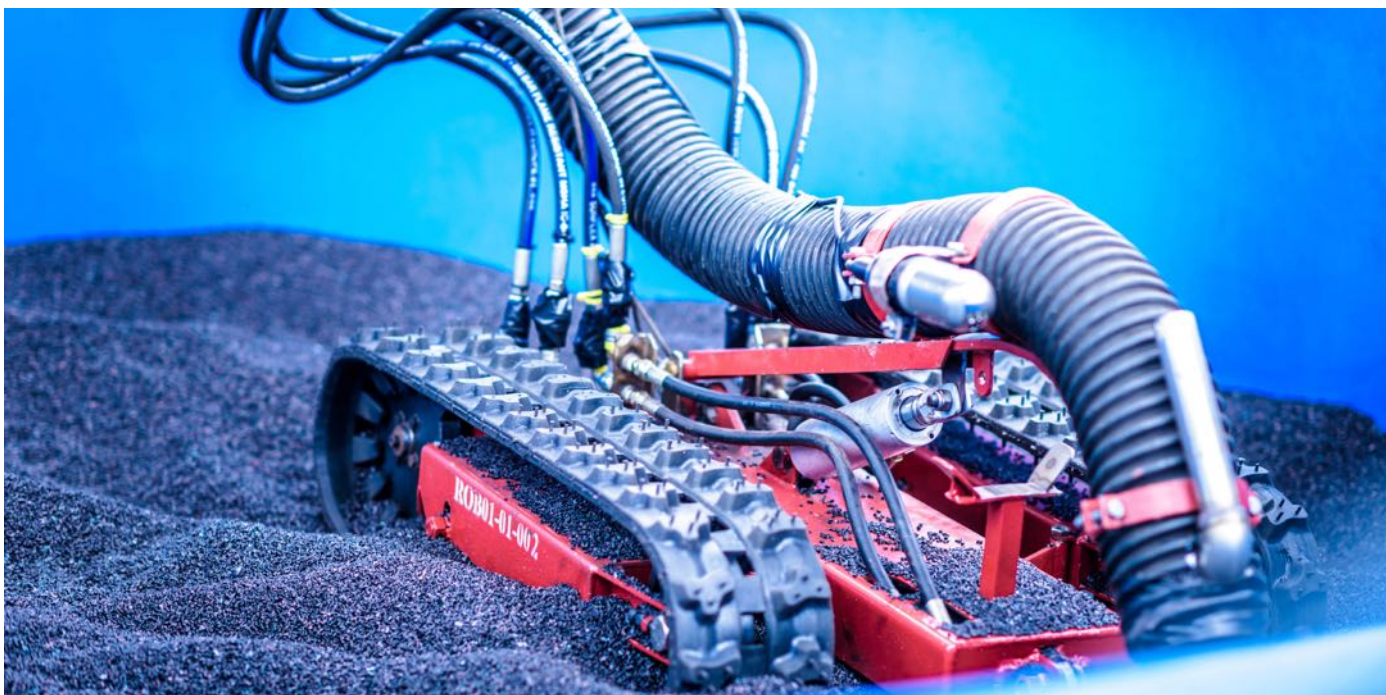
will work with HSE Manager, Mr Hithi to ensure occupational safety compliance in the workplace. Kumar's accomplishments include a Master of Commerce and other professional certifications such as an Advanced Certificate in Workplace Safety and Health.

KELLIE TIMKO



Kellie Timko joined CR Asia Group in April, as the Corporate Communications Manager. She will collaborate with personnel to generate stories and content for our company newsletter,

LinkedIn Page, Facebook Page and website. Kellie is published in various magazines and blogs for her travel and food write-ups and has a background in project controls with large engineering firms. She is quite creative with content and looking forward to this new challenge. Kellie is learning to speak Chinese to help her two daughters master the language they study in a local Singapore school. Originally from Australia, Kellie followed her husband to Asia ten years ago. Most of that time living Singapore with a stint of three years in Manila.



MEET ROVER

By David Young

At CR Asia, we value the safety of our people! Minimising their exposure to hazardous environments is what led to the development of Rover - A remotely operated vehicle designed to significantly reduce and even eliminate personnel entering confined spaces to unload catalysts — substituting risks to personnel with innovative technology.

SUBSTITUTING RISKS TO PERSONNEL WITH INNOVATIVE TECHNOLOGY

Purposely built to fit through most standard manways, Rover gets lowered into a reactor through its top access point. Remotely controlled by an operator, the sturdy tracked design and guy wires allow it to move freely within the reactor as it unloads essentially, the entire contents, at rates comparable to or better than conventional unloading.



CATALYST HANDLING, TANK CLEANING, INERT ENTRY

Rover operates in all types of conditions, including underwater and in temperatures up to 100 degrees Celsius. It is also certified to operate in zone 0 classified areas. Moreover, Rover does not need to take frequent rest breaks, unlike its human equivalent, therefore shortening catalyst replacement schedules. For large reactors, multiple units can be used simultaneously to minimise schedules further.

Rover is equipped with lights, camera and a vacuum hose. An additional mechanical arm can be customised with tools for specific applications, such as removing fused or coked catalysts.

Since 2017, clients have recognised the outstanding value of Rover. They now specify it in their contracts as a requirement for unloading reactors.

MINIMISE CONFINED SPACE ENTRY

Proven to minimise confined space entry significantly, it also reduces replacement schedules on challenging jobs by up to 30%.

Specify Rover for your next catalyst replacement job! Contact your local CR Asia office to arrange a demonstration. CR Asia is committed to offering the most comprehensive maintenance services. Count on us to be your reliable partner.

YOUR RELIABLE PARTNER

Increased Confidence. Faster Return to Service.

Heat Exchangers

Delivering tube cleaning and inspection as one combined service.



Your Reliable Partner
crasia.net

Right Solutions • Right Partner
alsglobal.com

The Problem

- Heat exchanger and boiler tubes must be cleaned to the correct cleanliness level in order to collect good data and provide accurate inspection results.
- There is often debate between cleaning company, customer and inspection company as to whether tubes are clean enough or not.
- Cleanliness issues can lead to delays in the inspection, missed timelines and ultimately poor quality inspection data and inaccurate results.

The Solution

- Inspection company works closely together with the cleaning company to ensure the tubes are cleaned to an acceptable level of cleanliness.
- Pre-agreed standards and methods ensure that tubes are cleaned to the required level as efficiently as possible with both teams cooperating.
- Work closely together to ensure cleaning is completed effectively to reduce downtime ensuring accurate inspections completed on schedule.

Cleaning

Cleaning is carried out with inspectors present to ensure the desired level of cleanliness is achieved first time.

Checking

Tube inspection personnel work together on site with the cleaning company during the cleaning process to check and approve tube cleanliness.

Inspection

With clean tubes the best quality data is collected and the best inspection results provided without delays, saving time and money.



Client

- One contractor.
- Best data. Best inspections.
- Efficient. Less downtime.
- Faster return to service.

CR Asia

- Automated bundle cleaning equipment.
- Less downtime.
- Safer and faster overall cleaning.
- Most efficient service.

ALS

- Better cleanliness.
- Better data.
- Better inspection results.
- Faster completion.

Optimum
cleaning

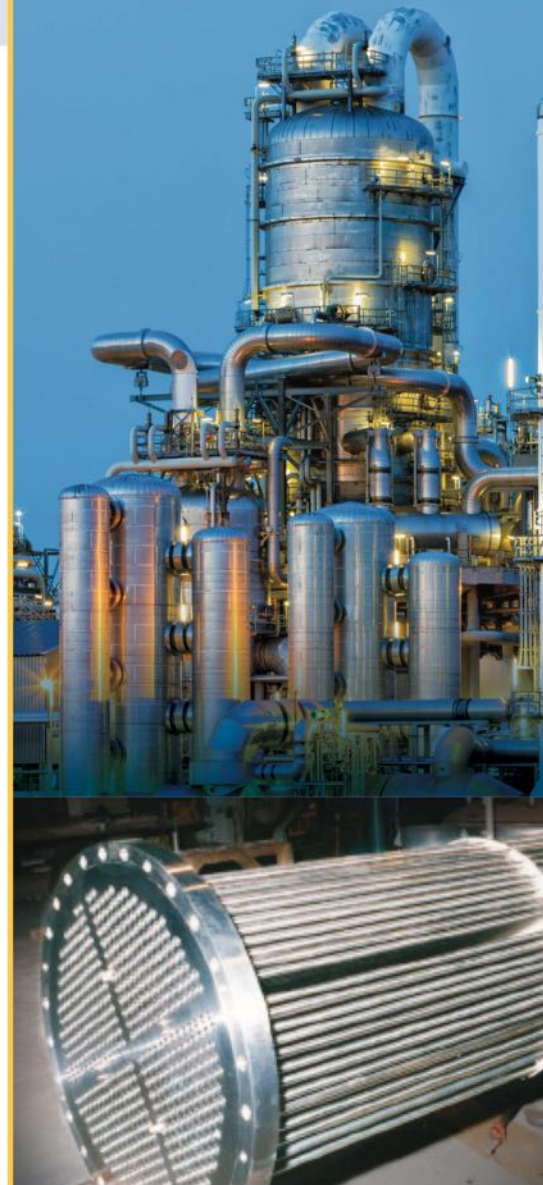


Quality
data



Best
result

ALS and CR Asia have joined forces to offer combined cleaning and inspection services. Reduce downtime with this highly efficient, world-class solution for heat exchanger and boiler inspections.



Contact us today to speak to our integrity experts:

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