

Engineering Newsletter 06

MOMENTS

November 2004



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Civil Engineers
Ministry of Public Infrastructure and Land Transport

From the Desk...

Kiran BHUJUN

Welcome back to another issue of **MOMENTS**.

This month went by very fast for us, may be as a result of an excessive workload, or from the realisation that it is 24 November and that no articles have been written / received for this month's issue...

This month has been marked by accrued internal discussion about the significance of the terms "Quality of works" in the Civil Engineering Section, with respect to the works being undertaken by private contractors on construction sites. The matter has reached such a level that **MOMENTS** has decided to dedicate this month's **HOT SPOT** to this topic.

We are also, this month, proposing an introduction of the Mare Chicose Sanitary Landfill, in a combined article of **LOCAL NEWS** and **ASPECTS**. This follows the commission of enquiry on alleged fraud and malpractice, where the Mare Chicose Landfill was rocketed as a public topic of discussion. We will discuss its functioning, purpose, cost and other related features.

This month's innovative Civil Engineering Design has also focussed on one of Mauritius recent large site of construction, namely that of the Midlands Dam.

This month's issue also marks the start of the long awaited response and interaction by other members of the Civil Engineering Section. We begin with a critical analysis, from Mr. A. Jhuboo, Ag. Principal Engineer, of the Grand Bay Blast, to enhance our simplistic analysis in the last issues. This Reader's Corner took the size of a double page and is being presented on pages 8 and 9.

On the Team front, two of us, Mrs. N. M-Jhowry and Ms S. Gaya, have, for professional reasons, requested to be relieved of their responsibilities towards **MOMENTS**. Their requests have been accepted and the Team wishes them well in their future endeavours and highly commend their patience and hard work towards this publication. This double exit implies that the Team is currently looking for at least one more person to join us in our task. Anyone interested? Two others went kaput on the way, and extra effort went in to complete their part. But all's well that end's well...

Happy Reading...

Every noble work is at first impossible.

(Thomas Carlyle)

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LOCAL NEWS / ASPECTS

Mare Chicose Sanitary Landfill: What is it?



What is a sanitary landfill?

A sanitary landfill – really a solid waste land disposal site – is a place where collected solid wastes (domestic, industrial, hazardous, etc) are compacted and stored in an inert environment. What is really confusing is that it is not at all a process whereby a natural depression on the earth surface is “filled” with solid wastes; it is more of a site where solid wastes are accumulated so that they eventually form a “hill of waste materials”. However, this “hill” consists of highly compacted wastes, so that they occupy the minimum space possible. Thus, wastes leaving one’s house generally have a density of about 200 kg/m³. These waste materials are compacted at Transfer stations to have a density of about 350-400 kg/m³ and are further compacted at the landfill site to weigh as much as 900-1000 kg per cubic metre.

Landfilling is one of a set of solutions available to “get rid” of wastes produced as a result of human dwelling and consumption. Other solutions are composting, incineration, recycling, education of consumers and non-production of

wastes! These cover an array of costs as well, with landfilling lying somewhere in the center of the cost chart.

When? Why? How much?

Mauritius currently has only one such landfill site, the Mare Chicose Sanitary Landfill, located in the village of Mare Chicose, in the south-east part of the island. This landfill, the first ever in Mauritius, was constructed over a period of 11 months, from February 1996 to January 1997 by Rehm Grinaker Co. Ltd, for the then sum of Rs 96.2 millions, under the supervision of Consulting Engineer Scot Wilson Kirpatrick Co. Ltd.

The Mare Chicose Landfill was constructed following a natural process of environmental awareness, when it became obvious to the Authorities that open air dumping grounds were harmful to the environment and were potential health hazard sites to the general public. In a first instance, two sites were identified: Mare d’Australia and Mare Chicose, with the former being technically preferred because of the low rainfall in that region. Following social pressure, the Mare Chicose location was finally chosen. The landfill site covers an area of about 22 hectares, taken on lease by the Government of Mauritius from the Compagnie de Beau Vallon Ltée, and falls under the responsibilities of the current Ministry of Local Government and Solid Waste Management.

The site is presently being administered by a private Contractor, STAM Ltée, under the supervision of Consulting Engineer GIBB Mauritius Ltd.

Continued on next page

LOCAL NEWS / ASPECTS

Mare Chicose Landfill: What is it?

Waste Reception

The following specific sequence of activities is generally adopted during the handling of wastes at the landfill:

1. Lorries entering the landfill site, from the various transfer stations, are weighed at the weigh-bridge on



entering the site.

2. The waste content of the lorries is inspected and the lorries are accordingly directed to a discharge bay. Hence, compactible wastes, non-compactible wastes and hazardous wastes are treated separately, and stored separately too. Examples of compactible wastes include domestic wastes, green wastes – branches, leaves, etc. Non-compactible wastes refer to such material like demolition materials and the like. Hazardous wastes, as defined by the Hazardous Wastes Regulations, include motor oil, batteries, lead, chemical compounds, etc.
3. The compactible wastes are disposed of in the day's working cell, and are compacted to the required optimum value. This working cell is then covered with a daily cover of

earth of specified permeability after each day's work.

4. the non-compactible wastes are either stored as such or disposed off to third-parties for alternative purposes;
5. Hazardous Wastes are generally embedded in an inert element, generally concrete and left as such.
6. The lorries are then washed, so that no waste is allowed back with them on the roads, and are weighed again, on their way out of the site.

Although the Mare Chicose Landfill Site was originally designed to accommodate a waste flow of about 400 tons per day, it is currently receiving some 1200 tons per day, with occasional peaks of 40,000 tons per day, in post-cyclonic or end-of-year periods.



Continued on next page

LOCAL NEWS / ASPECTS

Mare Chicose Landfill: What is it?



Gas and Leachate

Another facet of the site activities is the management of gas and leachate produced as a result of the landfilling process. Gas – mostly methane – is produced as a result of the anaerobic decomposition of the wastes. The same process produces leachate, a smelly and nearly colorless liquid.

The gas so produced is highly inflammable, has a characteristic smell, is toxic and is denser than air. It is collected via a complex network of collection wells and conduits, and is eventually disposed of by flaring, i.e. it is simply burnt off, in huge flares.

The leachate, on the other hand, is quite

difficult to handle. It is almost of the same consistency as water, and can also percolate through the ground, thereby contaminating the under-ground water reserves. Leachate collection is planned and designed as early as at the construction stages of the disposal cells. All these cells are first lined with layers of impermeable geo-textiles, equipped with automatic leak detection devices. The undersides of the cells are also lined with leachate collection drains, networked together and having an outlet into a leachate pond. The site has an in-built primary treatment plant, originally designed to locally treat the leachate to primary level standards, and subsequently discharging it in nearby water courses. This plant however, although designed to treat some 92m³ of leachate daily, can barely accommodate 30 % of that amount.

After cyclone Dina, and the subsequent expected increase in leachate, it was decided that no further treatment of leachate will be carried out on site, but that all of it will be carted away, to be disposed of at the St-Martin Waste



Continued on next page

LOCAL NEWS / ASPECTS

Mare Chicose Landfill: What is it?

Water treatment plant, for subsequent discharge along with the sewer effluent. With the increase in the volume of waste into the site, the average monthly volume of leachate carted away by the contractor has been around 8,000 to 9,000 m³.

Other considerations

Apart from the purely technical aspect of the landfilling activities, considerations on a landfill site, has also to be given to the surroundings, as well as to the welfare and health of the workers on site. The petitions and protests of the inhabitants of the Mare Chicose Village are



now common knowledge. The contractor on site is required to control nuisance propagation; these include dust, mosquitoes and rodents, noise, birds, litter and odour.

Many drastic measures are required from the Contractor, under the terms of his employment, to combat these. As an example, even the use of an appropriate and approved deodorant is prescribed to combat propagation of odour.

Similarly, workers on site are required under the terms and conditions of the contract, to have themselves medically

checked on a regular basis. The Contractor is also required to ensure that proper medical facilities are available on site for primary treatment against burns or wounds.

The future?

Mare Chicose was originally designed to have a life span of about 20 years, with an activity of around 400 tons of wastes per day. With the increase in waste reception to nearly 1,200 tons per day, it is now expected that the site will come to saturation within the next year or so!! This is definitely a frightening perspective, given that Mare Chicose is the only landfill on the island. So, what could the solution be? Should the authorities go for another landfill, in another location or find other alternatives? Well, both, according to officials from the parent Ministry. While works are in progress to enlarge the Mare Chicose site, over an additional 10 hectares, to enhance its capacity, surveys are also being carried out to identify possible other suitable locations for landfilling activities. Thus, alternative sites are currently being considered.

It should however be realized that the activities associated with the landfill will not stop when the site comes to saturation. The post-closure management could effectively run into decennies – about three decennies here – for the wastes to generate and release its expected potential of methane gas and for these to be flared off. Solid Wastes Disposal... not a simple thing after all... Reminds me of someone's words "Landfill: Everyone needs one, but no-one wants to see one "

Kiran BHUJUN
Norbert SEEVATHEAN

Innovative Civil Engineering Structures: The Midlands



The Midlands dam is located in the centre of the island at the foot of Lagrave Mountain in the upper course of Grand River South East (GRSE), in Mauritius, at an elevation of about 400 m. The initial storage capacity of the dam is 25,5 million cubic metres (Mm³) {same as Mareaux-Vacoas}. The dam will draw its water from a catchment area of 17.2 km² in a region that receives an average rainfall of about 4,000 mm per year.

The detailed design of the Midlands dam has been carried out by M/S Lahmeyer International GmbH of Germany; The construction of the Midlands Dam was awarded to Joint Venture DTP Terrassement - Bouygues TP in December 1999. The works started on site in January 2000 and lasted nearly 3 years. The site employed about 300 full time workers, among which some 40 expatriates, also on a full time basis.

The total Midlands Dam Project cost was some US \$ 60 million. The project was financed by the Government of Mauritius, the Kuwait Fund for Arab Economic Development and the Arab Bank for Economic Development in Africa (BADEA).

The length of the dam is 2,450 m and the maximum height above foundation level is 20.5 m. The dam is the first rockfill dam with asphalt concrete surface sealing in Mauritius. The total volume of rockfill used has been estimated at about 1.5 million cubic metres. Moreover, in the design and construction, provision has been made for a concrete cut-off wall, about 15-20 m deep and 60 cm thick, along the entire length of the Midlands dam. The cut-off wall will prevent

seepage, if any, within the submerged area whilst the asphaltic surface sealing on the rockfill prevent seepage through the rockfill dam. Both the concrete cut-off wall and the upstream asphalt surface sealing are being adopted for the first time in Mauritius.

The stone quarry was developed in an area of about 60 hectares and access roads constructed to the quarry site. Blasting operations were carried out by the Contractor under the supervision of the Special Mobile Force on part of nearby hill, Mount d'Hauvillard in order to obtain the required amount of rocks needed for the project. The pieces of rocks so obtained were then reduced into specific size in the on-site stone crushing plant.



The asphalt surface sealing has the following advantages:

- A low permeability to allow high water tightness with low thickness (generally 10 to 20 cm);
- The entire rockfill embankment becomes free draining allowing steeper slopes and reduction in embankment volume;
- Raising of the dam, if decided later, can be carried out without putting the reservoir out of operation.

It is to be noted that the maximum height of the concrete spillway above foundation level is some 30 metres and some 5,000 cubic metres of concrete were required for the works on site.

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READER'S CORNER

The Grand Bay Blast — A different analysis

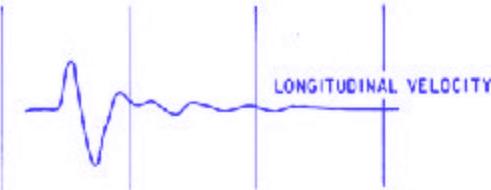
By Anil Jhuboo

DESCRIPTION OF EXPLOSION FORCES

An explosion is an extremely rapid release of energy in the form of light, heat, sound, and a shock wave. The shock wave consists of highly compressed air that wave-reflects off the ground surface to produce a hemispherical propagation of the wave that travels outward from the source at **supersonic velocities**.

As the shock wave expands, the incident or over-pressures decrease. When it encounters a surface that is in line-of-sight of the explosion, the wave is reflected, resulting in a tremendous amplification of pressure. Unlike acoustical waves, which reflect with an amplification factor of two, shock waves can reflect with an **amplification factor of up to thirteen**, due to the **supersonic velocity of the shock wave at impact**. The magnitude of the reflection factor is a function of the proximity of the explosion and the angle of incidence of the shock wave on the surface.

The pressures decay rapidly with time (i.e.,



exponentially), measured typically in thousandths of a second (milliseconds). Diffraction effects, caused by building features such as re-entrant corners and overhangs of the building may act to confine the air blast, prolonging its duration.

Late in the explosive event, the shock wave becomes negative, followed by a partial vacuum, which creates **suction** behind the shock wave. Immediately following the vacuum, air rushes in, **creating a powerful wind or drag pressure on all surfaces of the building**. This wind picks up and carries flying debris in the vicinity of the detonation.

In an external explosion, a portion of the energy is also imparted to the ground, creating a crater and generating a ground shock wave analogous to a high-intensity, short-duration earthquake.

The peak pressure is a function of the explosive size or yield, and the cube of the distance.

PREDICTING DAMAGE LEVELS

The extent and severity of damage and injuries in an explosive event cannot be predicted with perfect certainty. Past events show that the specifics of the failure sequence for an individual building due to air-blast effects and debris impact significantly affect the overall level of damage.

For instance, two adjacent columns of a building may be roughly the same distance from the explosion, but only one fails because it is struck by a fragment in a particular way that initiates collapse. The other, by chance, is not struck and remains in place. Similarly, glass failures may occur outside of the predicted areas due to air-blast diffraction effects caused by the arrangement of buildings and their heights in the vicinity of the explosion. The details of the physical setting surrounding a particular occupant may greatly influence the level of injury incurred. The position of the person, seated or standing, facing towards or away from the event as it happens, may result in injuries ranging from minor to severe.

DAMAGE MECHANISMS

Damage due to the air-blast shock wave may be divided into direct airblast effects and progressive collapse.

Direct air-blast effects are damage caused by the high-intensity pressures of the air blast close to the explosion. These may induce

READER'S CORNER

The Grand Bay Blast — A different analysis

(continued)

localized failure of exterior walls, windows, roof systems, floor systems, and columns.

Progressive collapse refers to the spread of an initial local failure from element to element, eventually resulting in a disproportionate extent of collapse relative to the zone of initial damage.

Localized damage due to direct air-blast effects may or may not progress, depending on the design and construction of the building. To produce a progressive collapse, the explosion must be in close proximity to a critical load-bearing element.

Progressive collapse can propagate vertically upward or downward from the source of the explosion, and it can propagate laterally from bay to bay as well.

BUILDING DAMAGE

The pressures that an explosion exerts on building surfaces may be several orders of magnitude greater than the loads for which the building is designed. The shock wave also acts in directions that the building may not have been designed for, such as upward pressure on the floor system.

In terms of sequence of response, the air blast first impinges the exterior envelope of the building. The pressure wave pushes on the exterior walls and may cause wall failure and window breakage. As the shock wave continues to expand, it enters the structure, pushing both upward on the ceilings and downward on the floors .

Floor failure is common in large-scale vehicle-delivered explosive attacks, because floor slabs typically have a large surface area for the pressure to act on and a comparably small thickness. Floor failure is particularly common for close-in and internal explosions. The loss of a floor system increases the unbraced height of the supporting columns, which may lead to structural instability. Typical damage types that may be expected include:

- localized failure of the floor system immediately below the explosion;
- damage and possible localized failure for the floor system above the explosion;
- damage and possible localized failure of nearby concrete and masonry walls and
- failure of nonstructural elements such as partition walls, false ceilings, ductwork, window cills.

Explosive pressures decay extremely rapidly with distance from the source. Pressures acting on the building, particularly on the side facing the explosion, may vary significantly, causing a wide range of damage types. As a result, air blast tends to cause more localized damage than other hazards that have a more global effect.

Moreover, the duration of the event is very short, measured in thousandths of a second, (milliseconds). In terms of timing, the building is engulfed by the shockwave and direct air-blast damage occurs within tens to hundreds of milliseconds from the time of detonation due to the **supersonic velocity** of the shock wave and the **nearly instantaneous response of the structural elements**. By comparison, earthquake events last for seconds **and wind loads may act on the building for minutes or longer**.

(To be continued)

Acknowledgement & Bibliography

Design of Commercial Buildings to Mitigate Terrorist Attacks

PROVIDING PROTECTION TO PEOPLE AND BUILDINGS

December 2003, FEMA 427, USA

Farewell...

Farewell is not always bid only to elders. The Team takes time this month to express its best wishes for a prosperous career and future to one of our most brilliant Trainee Engineer:

Mr. Deepak Rittoo.

This young man, quiet and frail in appearance, joined us in November 2002 with a view of completing his professional training for obtaining his registration with the Council of Registered Professional Engineers of Mauritius

During his traineeship, Deepak has been an outstanding young Engineer, always impressive in his mastering of the subject, helpful to everyone, and most important, always alert on Engineering matters.



From the **MOMENTS** Team and in the name of the Civil Engineering Section:

“Best of Luck and keep the good work going”

In Abeyance

While waiting for the New Year ...

While waiting for New Year and the associated festivities, members of the Civil Engineering Section are organising a barbeque party on **10 December as from 1800hrs** on the Flic-en-Flac public beach.

Members of the Civil Engineering Section are requested to contact **Norbert Seevathean (nseevathean@mail.gov.mu)** or **Kavi Santchurn (ksantchurn@mail.gov.mu)** for contribution and details.

December B'Day Boys



A.S. Gooljar



B.L. Gowreesunker



M.R. Salaaroo

Proposals from prospective organizers regarding the venue and type of end-of year celebration, at the Civil Engineering Section level, is being requested from our members. Suggestions to be made to the Acting Chief Engineer.

Welcome...

New Comers to the Civil Engineering Section



Dr. Nishant Kumar Shrivastava

Dr. N.K Shrivastava is the latest new-comer in the Civil Engineering Section. This Indian citizen has been employed under contract by the MPI in the capacity of Advisor (Structural Engineering).

Dr. N.K. Shrivastava is the holder of a PhD in the area of Finite Element Analysis, awarded from the Indian Institute of Technology, Delhi, following the completion of his BE(Civil Engg) and ME(Structural Engg) from Jabalpur Univ.

Before coming to Mauritius, he worked in the team responsible for the design and execution of the Rajasthan State Legislative Assembly, which comprise a dome of about 32m diameter. He has also worked in the Rajasthan State Road Development Co. Ltd, as well as the Rajasthan State Bridge & Construction Corporation Ltd.

Dr. Shrivastava is married and the father of two children.

He has currently been posted with the unit looking after Education Projects, and has been assigned the design responsibilities of some steel structures.

Office Tips: Afternoon Slumber

We all hit that difficult part of the afternoon when our energy dips, our concentration falters, and it feels like we are not going to stay awake until the end of the workday without crawling under the desk to take a nap. At times like this, we reach for a cup of coffee, a can of soda, a snack or a chocolate bar to help us gear up.

There are healthier ways to beat the 2 p.m. slump. Here are some suggestions for keeping your inner engine purring steadily until its time to head back home.

Eat Right- Your diet can make a big difference in your energy level throughout the workday. One of the best remedies for the 2 p.m. slump begins long before the afternoon arrives; a steady flow of energy for the day begins with breakfast and also snacks. Snack-ing is a good way to pick up plummeting energy levels, as eating every few hours helps your body use its fuel more efficiently, stimulates your metabolism and keeps your energy flow constant -- but only if you reach for the right kind of fuel. For a midday snack, try fruits and vegetables instead of sweets or a chocolate bar, which are laden with simple sugars and will bring on fluctuating and er-

atic energy levels. For a late-afternoon snack, try a lean protein, like low-fat yogurt, a lean meat sandwich or peanut butter with a few crackers.

Move Around - When you hit that sleepy part of the day, try to resist going straight for the coffee pot, and get up from your desk and take a walk outside instead. Getting up, moving around and experiencing a change of scenery really help you wake up. If you can, schedule your active errands for that time of day.

Laugh a Little - get up from your desk for a few minutes and have a laugh with your co-workers, laughter is some of the best work-slump medicine.(provided you are not disturbing the others)

Office Yoga - While sitting at your desk raise your arms straight up above your head, flap your hands really fast and breathe in and out quickly. Do this for as long as you can manage -- or until your co-workers notice - and if they do...refer back to laugh a little. No harm looking like a chicken for staying awake sake :-)

Have a nice time...

Sources: various

Quality of Work: Assessment and Enhancement

The Definitions

Quality of Work is defined as that state when works have been executed so as to respect or exceed the norms, or standard, set prior to the start of works.

In the context of the activities of the Civil Engineering Section, quality of works very often boils down to making sure that construction works on site are to the standard as set in the Governmental General Specifications.



While the above definition is true for construction sites, for the planning of projects, or the handling of requests, quality of work may also mean the depth of thought given to a request. It is also associated with the forecast of other works which may also be requested in the near future on the same site, and which can be associated with the initial one. This is to enable an overall rehabilitation instead of piece-meal work on the same site, time and again. This approach is more geared towards customer's satisfaction and suggestions for the improvement of the site.

The general opinion among experts within the field is that quality of work comes with a price. The closer a Contractor comes to the expected quality of work, the higher will be his operational price.

Engineer's Role

One of the means available, or rather one of the means required to achieve a high level of quality of work, is the use of enhanced and more explicit set of specifications and drawings. It is a fact that the Specifications being currently used dates from 1966 and it surely needs urgent uplifting to demonstrate and integrate the progress made in the quality and availability of materials in the construction industry. No examples will be quoted here... a flip through these specifications, if found, will prove my point. Similarly, many of the standard drawings presently available are no longer standard any more. As example: our many standard sheets, where reinforcement very often needs to be re-calculated to meet the provisions of more recent design codes of

practice.

It is strongly felt that a more elaborate and up-to-date specification is now very much a need at the Civil Engineering Section. With the preparation of Tender Documents for various non-capital projects, it is often felt that one of the weakest link in the contractual chain is in fact the set of specifications currently in hand, because of its incompleteness. Can we, Engineers, spare some time and set-up a board to review the required items, draft the specifications and incorporate them as new standard specifications? This will, no doubt, be a better foundation for our projects.

A second step towards an enhanced quality of work is control of the progress of work on site. However, this is rarely possible, mainly because of the sheer workload on the shoulders of each one of us. Ideally, quality of work can be enforced if Resident Engineers are appointed on a site. This has the double effect of readily having someone available to approve the works, when so required, as well as a closer monitoring of the technical aspects on the site of work.

The collapse of a boundary wall at Quartier Militaire following a heavy rainfall at the beginning of the year is a vivid example of non-ability to monitor our sites of construction to our own satisfaction. Enquiry showed that the wall was hastily constructed, at the end of the Defects Liability period, during the end-of-year season, and without any approval from the Project Engineer with regard to its the structural aspects.



While in the recent past, one or two projects have been deemed so important that an Engineer was assigned only that project, this is no longer the case nowadays. As a result, many of the routine approvals are left under the care of the Technical Officers; while the competence of these officers are not in doubt, they are already in a situation of under-representation at the Civil Engineering Section,

HOT SPOT

Quality of Work: Assessment and Enhancement

(9 Technical Officers for 30 Engineers) and their overload of activities is but too obvious..

One of the ways to enhance the quality of work would be to increase site contact hours, by accordingly reducing workload in office, or by the re-introduction of the concept of Resident Engineer... but that too will be at a cost: that of employing many more Engineers than are currently on our establishment. A line of communication should also be opened with Contractors, so that they are formally made aware of what is expected of them; may be a general written policy at the Civil Engineering Section level might be envisaged, so that all Engineers are made aware of what is expected of them and also so that the same procedure is adopted by all. This will help reduce protests like "Engineer Mr. X has accepted this type of work on another site" whenever some piece of work is not approved.

Contractor's Role

The most important actor for having an acceptable quality of work on site, however, remains the Contractor, and his general attitude to the works. Contractors of all grades should realize – or failing that, made to realise – that the works is not only a question of him making profit, but also delivering the goods. Contractors should be made to realise that being registered with the MPI does not simply mean having the financial capacity to tender for such or such works, but also having the required technical expertise.

An occurrence on one of our sites: a registered contractor started enquiring about "what is that slump test that you are asking for?" and to add insult to injury "why should I take 3 concrete cubes for testing on a single day? Should 1 cube per test not be enough?".... please pass me some head-ache relief someone....

Or another one: "It will take me 2-3 weeks to supply you with the concrete mix design, but I will start concreting right now" – it actually takes less than 1 day to obtain this mix design from the pre-mixed concrete batch plant; the Team checked it out.



Should we now start thinking whether it would be appropriate to ask ALL contractors to have a proper technical support on site at all times? Along with enhancing the monitoring of the works on site, this will also help the country by creating more job prospects for Engineers.

Ministry's Role

One of the possible solutions to this current state is to have more strict quality control on site. Why? Because we are professionals and have to behave in a professional manner; and also, because we are accountable for public funds! Engineers should be recognised as being able to take responsibility of their acts and empowered to apply the rules as laid down in the Specifications. Why should a Contractor be allowed to slalom around restrictions set forth to check the quality of his work? If the Conditions of Contract says that Contractors are required to submit their reinforcement compliance certificate or concrete mix design before the start of concreting works on site, why should some "big brother" interfere and force the Engineer to allow works to be carried out without these? And the penalty for non-toeing the line? The Engineer is replaced on the site by someone more "flexible". The Civil Engineering Section is not the only section facing such pressure, but we should fight back!



Welcome to a Contractor's World—where the supervising professionals are chosen by the Contractor himself.

Is it not time for the Civil Engineering Section to send out a loud and clear message that we mean business? It is increasingly being felt that the time is now very ripe for some written guidelines, so that all Engineers know what can be accepted and what cannot... or some may say, what can be accepted from whom and whom shall be taken to task...

As a conclusion, it is also time for all to realise that enforcement and respect of quality of works is not a "boycott" of the progress of the works, but rather a guarantee that the construction is safe, durable and to the required standard...

Better be safe than sorry, right?

CONCEPTS

Innovative Civil Engineering Structures: The Midlands Dam

The spillway comprise four spans of 12.5 m each with a central pier, 6 m wide, and the remaining two piers, 1.5 m wide each. The maximum height of the concrete spillway above foundation level is some 30 m.



The first stage consisted of removing the unsuitable existing soil on which the Dam was

to be constructed and providing drainage to lower the groundwater level, followed by excavation of the alluvial soft subsoil down to the bedrock.

Provision has also been made for hydropower

generation in the future (if found economically feasible). This will be carried out by the steel pipe already incorporated for this purpose in the concrete spillway

The Midlands Dam falls under the responsibility of the Water Resources Unit of the Ministry of Public Utilities.

The additional volume of water available as a result of the Midlands Dam is currently helping to ensure:

- 100% satisfaction of domestic, industrial and touristic water demand in the North;
- 100% satisfaction of the irrigation needs of the existing Northern Plains Irrigation Project, Phase-1, irrigating about 2,000 hectares;
- Irrigation of an additional area up to 2,850 hectares

Source: Water Resources Unit

LEGAL CORNER



This is the first of a series of interactive articles, as experienced by one or some of us at the Civil Engineering Section. We invite readers to participate with their comments and analysis to widen the debate. Note that all dates are for discussion purposes only.

CASE #1:

At the Civil Engineering Section, a majority of the non-capital projects are being handled with the use of the FIDIC 4th Edition Conditions of Contract.

On one of our sites, where demolition of existing fencing and erection of new fencing works is in progress, the inhabitants were demanding that the location of part of the fence be altered to accommodate the passage of their private vehicles.

The Project Engineer re-directed the complainants to the Client Ministry on 15 October 2004. Meanwhile, those people lodged a complaint with their local authorities, regarding this "trespass onto their passage way" on 18 October 2004.

The representative of the Local Authorities visited the site on 22 October 2004 and issued a "Notice to stop works" to the Contractor on Site. The latter promptly complied.

DISCUSSIONS:

Is the Contractor entitled to any extension of time and as at 30 November 2004, what would be the duration thereof?

Can the Contractor claim for Loss and Expenses as a result of this Suspension of Works?

Send your comments to kbhujun@mail.gov.mu or nseevathean@mail.gov.mu



TIPS FOR A HAPPY MARRIAGE :-)

1. Two times a week we go to a nice restaurant for good food and companionship. She goes on Tuesdays. I go on Fridays.
2. We sleep in separate beds. Hers is in Curepipe and mine is in Grand Baie.
3. I take my wife everywhere, but she keeps finding her way back.
4. I asked my wife where she wanted to go for our anniversary. "Somewhere I haven't been in a long time," she said. So I suggested the kitchen.
5. When we go to the shopping centre, we always hold hands. If I let go, she shops.
6. My wife told me the car wasn't running well because she thought there was water in the carburetor. I asked

where the car was. She said, "In the lake."

7. Before you take the leap into matrimony, remember this: Marriage is the number one cause of divorce.
8. In fact, statistically 100 percent of all divorces start with marriage.
9. I haven't spoken to my wife in almost a year. I don't like to interrupt her.
10. I'll admit the last fuss we had was my fault. My wife asked, "What's on the TV?" I answered, "Dust!"

Sorry if this comes too late for some of us :-))

MOMENTS is now on the web and can be downloaded from our Ministry's web-page web : <http://publicinfrastructure.gov.mu/news.html>

Please use this visit to check out the Civil Engineering Section web-page too...

The Team invites all those interested in submitting articles to **MOMENTS** to do so as soon as possible after the publication of each issue. Please contact any of the Team members for any additional information.

Disclaimer:

*Opinions expressed are those of the respective authors, and are not, **IN ANY CASE**, to be taken as those of the Ministry of Public Infrastructure, or of the Government of Mauritius.*



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Articles and any suggestions towards improving the quality of this newsletter are most welcome.

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