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CA Consultants Limited
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VACUUM SEWER SYSTEMS

In its bid to protect public health and prevent disease, the Federal Government of Nigeria is concerned about sewage collection and disposal system throughout its cities. A sewage system through pipe work may convey the wastewater by gravity or by vacuum system to a sewage treatment plant, septic tank or soak away pit which is popular in Nigeria.

The gravity sewer system is the oldest known method of sewer transportation. This system uses gradually sloping pipeline to transport the sewer to the treatment plant. It works well where the property is located in a landscape that has gradual slope, low water table and free of flooding.

The vacuum sewer system beat all the above limitations. High groundwater table, flat terrain (lack of natural slope), unfavorable soil conditions like sandy, unstable or rocky ground are the ideal circumstances in which to use vacuum sewer systems.

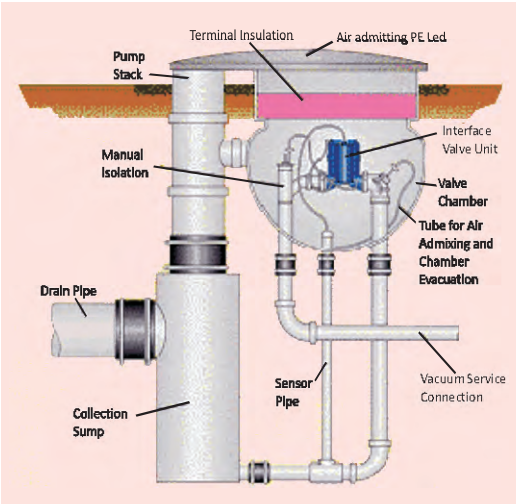
Vacuum technology is based on differential air pressure (like sucking air from a container to drain the fuel via an inserted hose). A vacuum pump generates an operation pressure at the vacuum station, which is also the only element of the vacuum sewage system that must be supplied with electricity. Interface valves that are installed inside the collection chambers for several houses work pneumatically. All sewage flows by gravity into each house's collection sump. After a certain fill level is reached inside the sump, the interface valve will open. The impulse to open the valve is usually transferred by a pneumatically (pneumatic pressure created by fill level) controlled controller unit. No electricity is needed to open or close the valve. The energy is provided by the vacuum itself. While the valve is open, the resulting differential pressure between atmosphere and vacuum becomes the driving force and transports the wastewater towards the vacuum station. After approximately 5 seconds the valve closes and the process starts again. High flow velocities keep the system free of any blockages or sedimentation therefore other manholes are not necessary.

Once waste water gets into the vacuum collection tank at the vacuum central station, the wastewater is pumped to the treatment station directly. As the dwell time of the wastewater inside the system is very short and the wastewater is continuously mixed with air, the sewage is kept fresh and any fouling inside the system is avoided (less Hydrogen Sulphide or Methane).

Basic elements of the vacuum sewer system

The three main components of a vacuum sewer system are:

- Collection chambers and vacuum valve units
- Vacuum sewer lines
- Central vacuum station



Vacuum Collection and Valve Unit

Advantages of vacuum sewer system

When considering the technical, ecological and financial aspects of wastewater collection, vacuum sewerage provides an effective alternative to other options. In comparison to conventional gravity or pumping systems, vacuum system offers the following important advantages:

A Central Vacuum Station

Inside this issue:

Benefits

- One central vacuum station replace several pumping stations
- No manholes and deep or wide trenching required
- Electricity consumption of vacuum station is low, saving energy and money.
- Low maintenance cost.
- Small diameter pipelines (DN 80 – DN 200)HDPE or PVC
- Shorter construction period
- Can be used for collection in already developed environment.
- Closed systems with no leakage or smell.
- No ground water pollution.
- There is no clogging/sedimentation in Vacuum sewer mains due to self-cleansing high velocity in the sewer pipes.
- Flexible pipelines construction.

We will love to hear from you! Please send your comments, suggestions and contributions to: info@cacons.com

OFFICE BUILDINGS EXPERIENCE

An office building can reflect the values and objectives of a company as well as bolster her corporate brand. With this in mind, CA Consultants Limited pays attention to the building communication details during the planning and construction processes in order to provide cost effective designs that creates pleasant and healthy working environments that communicates growth. We put into consideration all areas of the design process which include the impact of environmental regulations on the building's form, occupants well-being and detailed study of mechanical and electrical components.

CA Consultants Limited has provided Mechanical and Electrical Engineering design and supervision services for the construction of some office buildings in order to create a functional internal spaces. We have provided a high level of comfort and operational efficiency in office buildings by creating a balanced and controllable internal environment, natural ventilation, lighting, plumbing air conditioning systems which are combined with lift and fire fighting services.

Maersk House, Victoria Island, Lagos

At CA Consultants, we have a high-performance building design approach that begins with the simple orientation of the building through MEP design construction into operations and maintenance (O&M). One of our major tasks is to find ways to reduce HVAC and Electrical loads as we look to optimize the active system like the fans, pumps, chillers, etc. We also try to incorporate renewable energy strategies where appropriate.

Stanbic IBTC Bank Branch, Ajose Adeogun Street, Victoria Island, Lagos

CEO'S COLUMN

Volume 9 Issue 1

Dear Reader,

We welcome you to 2014 as you join us on this edition of our newsletter. Amongst other topics in this issue, we are delighted to share with you our office building projects experience, which are one of the fastest moving project types because they are heavily influenced by the short-term leasing.

In order to include issues/articles that are important to you and your industry, we would love to hear from you, e-mail us at info@cacons.com with your suggestions.

If you will require reprints of previous newsletter, kindly visit our website www.cacons\newsletters to download the newsletter.

Your active support is crucial. We thank you for staying with us all these years and we do sincerely look forward to hearing from you.

Engr. Charles 'Yele Akindayomi

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Founder/CEO

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OFFICE BUILDNGS EXPERIENCE

Although most office building owners seek to build a signature structure from the ground up, we are often times asked to design retrofit office spaces to increase or maximize the occupancy of the office building by retrofitting existing buildings. These projects sometimes involve working on multiple tenant improvement by adding new features to older systems along with new construction. We've had the experience of replacing MEP systems of some buildings while the occupants are using the core of the buildings. Example of an existing building that we retrofitted is ExxonMobil House Building in Victoria Island, Lagos.

We rendered a retrofitting service at ExxonMobil House Victoria Island, Lagos

Bank PHB Office Building at Victoria Island, Lagos

Globacom Building Adeola Odeku Street, Victoria Island, Lagos

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Our Services

FEASIBILITY STUDIES:
Technical and economic surveys, comparative cost evaluations and recommendations into various methods of resolving a problem. Preparation of project reports.

DESIGN:
Design of air-conditioning, electrical , extra low voltage, lighting, plumbing & drainage systems.

CONTRACT:
Preparation of specification, functional and layout drawings for tender action.

DOCUMENTATION:
Preparation of Bills of Quantities as required.

COST CONTROL:
Budget estimating. Evaluation of Tenders. Valuation of Variations. Certification of interim payments and final accounts.

TROUBLE SHOOTING:
Investigation, reporting and recommendations on faults or lack of performance, on Mechanical and Electrical systems.

ADVISORY SERVICE:
The company advises on refurbishment and remedial works and provides supervisory site staff as required. The company is completely independent of any manufacturing, supply or construction company and its advice is completely professional and unbiased in anyway.

About Us
In just 26 years, CA Consultants Limited, an ISO 9001:2008 Certified, Mechanical, Electrical and Piping consulting engineering firm has grown to a professional and technical staff of 24 out of our 42 employees. In 2000-2014, we completed more than 150 projects for diverse clients.

We appreciate your comments, suggestions and recommendations , please send them to any of our addresses above.

ON-GOING PROJECT

On-going Standard Chartered Bank Head Office Project at Ahmadu Bello Way, Victoria Island, Lagos

CA Consultants Limited designed the MEP systems of this 14 storey Standard Chartered Bank Head Office building located at Ahmadu Bello Way, Victoria Island Lagos.
The air conditioning is provided by air cooled water chillers located on the lower roof of the building. Each floor is provided with air handling units (AHU) that will supply cool air which will be ducted throughout the floor with variable Air Volume (VAV) boxes to control air requirements in various sections of the floor. The building fresh air requirement is provided by a roof mounted fresh air unit. Pressurization fans are provided in order to prevent ingress of smoke into the office area in a fire situation, so as to allow easy evacuation of occupants.

Electrical power supply to the building will be from PHCN 11KV transformer (2MVA 50Hz 11/0.415KV), 3no. 1000KVA and 1no. 500KVA sound proof generators to serve as back-up power to the mains power supply from PHCN.
The lighting systems is provided from artificial and natural lighting which will be controlled by ceiling mounted presence detector while manual switches were allowed to override the automatic control. The system will have capability to dim and ensure day light is utilised to provide a significant proportion of the required design illuminance level. This in effect, improves the energy sustainability of the building.
The piped services installation includes water supply system, drainage system, water harvester tank and fire fighting system comprising of sprinkler, hose reel and fire hydrant. A 10m3/hr borehole and water treatment plant is provided. In addition, two underground diesel storage tanks are provided to supply diesel to four standby generators located on the site. The underground sewage treatment plant is provided to treat the entire soil and waste water from the building before disposal into the public drains.

The building is provided with an integrated Building Management Systems (BMS) to monitor and control the chillers, air handling units and the electrical panels.

Quality Policy

" To be trusted advisers in Building Engineering System and Infrastructure who satisfy customers' expectations through active customer listening, deployment of highly competent and motivated workforce, use of advance technology, nurturing of long term mutually beneficial customer relationship and the continual improvement of our Quality Management System while complying with applicable national & international statutes and regulations".