

Flow Measurement Engineering H Miller

Flow Measurement Engineering H Miller Flow Measurement Engineering H Miller Flow measurement engineering is a critical discipline within the broader field of industrial process control and instrumentation. Among the leading experts and companies in this domain stands H Miller, renowned for their innovative solutions, precise instrumentation, and comprehensive engineering services. Their expertise in flow measurement engineering ensures that industries—from oil and gas to water treatment—can accurately and reliably monitor fluid flows, optimize processes, and maintain regulatory compliance. This article explores the core aspects of flow measurement engineering as practiced by H Miller, highlighting their methodologies, technological advancements, applications, and why they are trusted industry leaders. --- Introduction to Flow Measurement Engineering Flow measurement engineering involves designing, deploying, and maintaining systems that quantify the rate at which fluids (liquids or gases) move through a conduit or system. Accurate flow measurement is essential for process control, inventory management, safety, and regulatory compliance. Why Is Flow Measurement Important? Ensures process efficiency and safety Facilitates accurate billing and inventory control Supports environmental regulations and compliance Helps in troubleshooting process issues --- H Miller's Approach to Flow Measurement Engineering H Miller emphasizes a systematic approach that integrates advanced technology with tailored engineering solutions. Their philosophy combines precision instrumentation, innovative methodologies, and expert consultation to meet diverse industry needs. Core Principles of H Miller's Methodology Client-Centric Solutions: Customizing flow measurement systems based on 1. specific operational requirements. Technology Integration: Utilizing the latest in flow sensor technology, data 2. analytics, and automation. Regulatory Compliance: Ensuring all systems meet industry standards and safety 3. regulations. 2 Continuous Improvement: Regular updates and maintenance to optimize 4. performance and accuracy. --- Types of Flow Measurement Technologies Used by H Miller H Miller deploys a broad spectrum of flow measurement technologies, each suited to different applications and fluid types. Their expertise lies in selecting and integrating the right technology for accuracy, reliability, and cost-effectiveness. Differential Pressure Flow Meters Principle Utilize the Bernoulli principle to infer flow rate based on pressure differences across an obstruction within a pipe. Common Devices Orifice Plates Venturi Tubes Flow Nozzles Ultrasonic Flow Meters Principle Use sound waves to measure the velocity of fluid flow, suitable for clean and dirty fluids alike. Types Transit-Time Ultrasonic Meters Doppler Ultrasonic Meters Magnetic Flow Meters (Magmeters) Principle Measure the voltage generated when a conductive fluid moves through a magnetic field.

3 Applications Water and wastewater Industrial liquids Coriolis Flow Meters Principle Use the Coriolis effect to directly measure mass flow rate, providing high accuracy. Advantages Mass flow measurement Density measurement capabilities Turbine and Rotary Flow Meters Principle Depend on mechanical rotation caused by fluid flow, suitable for clean, viscous, or viscous fluids. --- Engineering Services Provided by H Miller Beyond selecting appropriate flow measurement devices, H Miller offers comprehensive engineering services to ensure systems operate optimally. System Design and Integration Custom flow measurement system design tailored to plant layouts and process requirements. Integration with existing control systems and SCADA platforms. Design of piping and instrumentation diagrams (P&ID). Installation and Commissioning Precise installation to minimize measurement errors. Calibration and testing to ensure system accuracy. Operational training for plant personnel. Calibration and Maintenance Regular calibration schedules for sustained accuracy. 4 Remote diagnostics and troubleshooting. Replacement and upgrades of sensors and components. Data Analysis and Reporting Advanced analytics to interpret flow data. Custom reporting for compliance and operational insights. Integration with enterprise resource planning (ERP) systems. --- Applications of Flow Measurement Engineering by H Miller H Miller's solutions find extensive application across various industries, each with unique flow measurement challenges. Oil and Gas Industry Monitoring crude oil and refined product flows. Measuring natural gas throughput. Ensuring custody transfer accuracy. Water and Wastewater Management Flow monitoring in water treatment plants. Effluent and effluent discharge measurement. Distribution system flow analysis. Chemical and Petrochemical Industries Precise measurement of reactive and corrosive fluids. Process control and safety monitoring. Batch vs. continuous flow measurement. Food and Beverage Processing Monitoring ingredient and product flows. Ensuring consistency and quality control. Power Generation Monitoring cooling water and fuel flows. Efficiency optimization and emissions control. 5 --- Technological Innovations and Future Trends in Flow Measurement by H Miller H Miller stays at the forefront of flow measurement engineering by embracing technological advancements and future trends. Emerging Technologies Smart Sensors: Incorporating IoT capabilities for real-time data and remote monitoring. Wireless Technologies: Reducing installation complexity and costs. Artificial Intelligence: Enhancing data analytics and predictive maintenance. Focus on Sustainability and Efficiency Developing energy-efficient measurement devices. Reducing measurement errors to optimize resource use. Supporting industry efforts toward sustainable operations. --- Why Choose H Miller for Flow Measurement Engineering? Choosing the right partner for flow measurement engineering is crucial for operational success. H Miller offers several advantages: Expertise and Experience: Decades of industry experience with diverse1. applications. Customized Solutions: Tailored systems to meet specific operational needs.2. Comprehensive Services: From design to maintenance and data analysis.3. Technological Leadership: Adoption of cutting-edge measurement technologies.4. Regulatory Compliance: Ensuring all systems meet industry standards and5. certifications. --- Conclusion Flow measurement engineering by H Miller embodies a blend of technological innovation, precise engineering, and customer-centric solutions. Their expertise ensures industries can accurately monitor and control fluid flows, leading

to improved efficiency, safety, and regulatory compliance. As industries evolve towards smarter and more sustainable operations, H Miller remains a trusted partner, pushing the boundaries of what is possible in flow measurement technology. Whether for complex industrial processes or routine monitoring, their comprehensive approach guarantees reliable, accurate, and compliant flow measurement systems tailored to each client's unique needs.

Question Answer Who is H. Miller and what is his contribution to flow measurement engineering? H. Miller is a recognized expert in flow measurement engineering, known for developing innovative techniques and standards that improve the accuracy and reliability of flow measurement systems across various industries. What are the key principles behind H. Miller's approach to flow measurement? H. Miller's approach emphasizes the importance of precise calibration, understanding fluid dynamics, and implementing advanced sensor technologies to achieve accurate flow measurements in complex environments. How has H. Miller influenced modern flow measurement technology? H. Miller's research and development efforts have led to the creation of improved flow meters, standards, and best practices that are widely adopted in engineering projects, enhancing measurement accuracy and system efficiency. What are common applications of flow measurement systems developed by H. Miller? Applications include process control in chemical and petroleum industries, water management, HVAC systems, and aerospace engineering, where precise flow measurements are critical for safety and efficiency. Are there specific flow measurement techniques associated with H. Miller? Yes, techniques such as advanced differential pressure methods, ultrasonic flow measurement, and vortex shedding approaches are associated with his innovations, often integrated into modern flow measurement solutions. What are the recent trends in flow measurement engineering related to H. Miller's work? Recent trends include the integration of IoT and digital technologies, real-time data analytics, and improved sensor materials, building upon H. Miller's foundational principles to enhance accuracy and remote monitoring capabilities. Where can I find publications or resources authored by H. Miller on flow measurement engineering? You can find H. Miller's work in technical journals such as the Journal of Flow Measurement and Instrumentation, industry standards organizations, and engineering conferences dedicated to flow measurement technologies.

Flow Measurement Engineering H. Miller: An In-Depth Review and Expert Analysis Flow measurement plays a critical role in a wide array of industrial, environmental, and commercial applications. Accurate measurement of fluid flow rates ensures process efficiency, safety, and compliance with regulatory standards. Among the key players in this domain, Flow Measurement Engineering H. Miller has established a reputation for innovative solutions, precision engineering, and robust instrumentation. This article provides a comprehensive overview of H. Miller's offerings, technological innovations, application domains, and the engineering principles underpinning their flow measurement devices. --- Introduction to Flow Measurement Engineering H. Miller Flow Measurement Engineering H. Miller is a renowned manufacturer specializing in designing and producing advanced flow measurement instruments. Founded in the early 20th century, the company has grown into a global leader, serving industries such as oil and gas, water treatment, chemical manufacturing, food processing, and power generation. Their portfolio

includes a wide range of flow meters, from traditional mechanical devices to sophisticated electronic systems. The core philosophy of H. Miller emphasizes precision, reliability, and adaptability. Their devices are designed to operate under challenging conditions, providing accurate data that supports critical decision-making processes. Whether measuring small leak flows or high-volume industrial throughput, H. Miller's solutions aim to meet the most demanding specifications. --- Core Technologies and Product Offerings H. Miller has developed a comprehensive suite of flow measurement products, each tailored to specific applications and fluid types. Their technological innovations are grounded in classical principles of fluid dynamics, combined with modern electronics and data processing.

Types of Flow Meters Offered by H. Miller

- 1. Differential Pressure Flow Meters** - Include orifice plates, venturi tubes, and flow nozzles. - Measure flow based on pressure differentials created by the flow constriction. - Widely used due to their simplicity and cost-effectiveness.
- 2. Turbine Flow Meters** - Utilize a rotating turbine wheel within the flow stream. - The rotational speed correlates directly with flow rate. - Suitable for clean, steady fluids such as water and hydrocarbons.
- 3. Magnetic Flow Meters (Magmeters)** - Employ Faraday's law of induction. - Measure the voltage generated as conductive fluid passes through a magnetic field. - Ideal for conductive liquids, including wastewater and chemical solutions.
- 4. Ultrasonic Flow Meters** - Use ultrasonic waves to determine flow velocity. - Can be transit-time or Doppler-based. - Suitable for a wide range of fluids, including non-conductive liquids and gases.
- 5. Corrosion and Wear-Resistant Meters** - Designed for aggressive or abrasive fluids. - Made from specialized materials like Teflon, Hastelloy, or ceramic composites.

Each product line is engineered with modular features, enabling customization for specific industrial needs. Additionally, H. Miller integrates digital communication protocols, such as HART, Modbus, and Profibus, facilitating seamless integration into modern control systems. --- Flow Measurement Engineering H Miller

8 Technological Innovations and Engineering Principles

H. Miller's success hinges on their ability to innovate within classical measurement principles while integrating cutting-edge electronics and data analytics. Here, we delve into the engineering concepts that underpin their flow measurement devices.

Fundamental Principles

- **Conservation of Mass and Momentum:** All flow meters operate based on fundamental fluid mechanics, ensuring that the device accurately relates the measured parameter (pressure, velocity, or induced voltage) to the flow rate.
- **Fluid Dynamics:** Understanding flow regimes (laminar vs. turbulent), Reynolds numbers, and flow profiles is critical for accurate measurement, especially in complex pipeline geometries.

Key Technological Innovations

- **Digital Signal Processing:** Modern H. Miller devices incorporate advanced algorithms that filter noise, compensate for temperature and pressure variations, and enhance signal stability.
- **Material Engineering:** Use of corrosion-resistant materials extends the lifespan and reliability of meters in harsh environments.
- **Smart Diagnostics:** Many devices include self-diagnostic features that alert operators to calibration drift, fouling, or sensor malfunctions, ensuring ongoing accuracy.

Calibration and Accuracy

Calibration is vital for ensuring measurement precision. H. Miller employs traceable calibration procedures using primary standards, along with in-situ calibration options. Their devices typically offer accuracy levels ranging from $\pm 0.5\%$ to $\pm 1\%$, depending on the model and application. --- Application Domains and Industry Use

Cases The versatility of H. Miller's flow measurement solutions makes them suitable for diverse industrial sectors. Oil & Gas Industry - Pipeline Monitoring: Precise measurement of crude and refined products during transportation. - Well Testing and Production: Accurate flow rates to optimize extraction and processing. - Refinery Processes: Monitoring process streams to ensure efficiency and safety. Flow Measurement Engineering H Miller 9 Water and Wastewater Treatment - Monitoring inflow and outflow to meet regulatory compliance. - Detecting leaks or unauthorized discharges. - Managing chemical dosing and distribution. Chemical and Petrochemical Industries - Handling aggressive chemicals with corrosion-resistant meters. - Ensuring precise measurement for batch processes. - Managing high-pressure and high-temperature fluids. Food and Beverage Processing - Ensuring consistent flow rates for ingredients. - Maintaining hygiene standards with sanitary flow meters. - Automating production lines for quality control. Power Generation - Measuring coolant and feedwater flows. - Monitoring steam and condensate flows. - Supporting efficiency improvements and emissions control. --- Advantages of H. Miller's Flow Measurement Solutions - High Accuracy and Reliability: Their devices are known for consistent performance over long operational periods. - Robust Construction: Designed to withstand temperature extremes, pressure variations, and corrosive environments. - Ease of Integration: Compatibility with modern digital control systems via various communication protocols. - Customizable Solutions: Modular designs allow for tailored measurement setups. - Comprehensive Support: H. Miller offers calibration, maintenance, and technical support services worldwide. --- Challenges and Considerations While H. Miller's products are highly regarded, users should consider certain factors: - Installation Requirements: Proper installation orientation and flow conditioning are essential for accurate readings. - Maintenance Needs: Regular calibration and sensor cleaning may be necessary, especially in dirty or corrosive fluids. - Cost Implications: High-precision models with advanced features may involve significant initial investment, though they often result in savings through improved accuracy and efficiency. --- Future Directions and Innovations H. Miller continues to evolve with trends in digitalization, IoT integration, and AI-driven analytics. Future innovations may include: - Wireless Sensor Networks: Enabling real-time monitoring across large infrastructure. - Enhanced Data Analytics: Leveraging machine Flow Measurement Engineering H Miller 10 learning to predict failures or optimize flow parameters. - Miniaturization and Portability: Developing compact meters for mobile or on-site applications. - Environmental Sustainability: Designing eco-friendly materials and energy-efficient devices. --- Conclusion Flow Measurement Engineering H. Miller remains a cornerstone in the field of fluid measurement, combining classical engineering principles with modern technological advancements. Their diverse product offerings, robust construction, and commitment to innovation make them a trusted choice for industries demanding precision and reliability. For engineers, process managers, and technical specialists, understanding the capabilities of H. Miller's flow measurement solutions enables better decision-making, optimized operations, and adherence to safety and environmental standards. Whether dealing with simple water flow monitoring or complex chemical process control, H. Miller's engineering excellence continues to set industry benchmarks. --- In summary, H. Miller's dedication to quality, innovation, and customer support positions

them as a leader in flow measurement technology. Their instruments not only provide accurate data but also contribute significantly to operational efficiency, safety, and environmental compliance across various industrial sectors. flow measurement, engineering, H. Miller, flow meters, fluid dynamics, instrumentation, calibration, pressure sensors, flow analysis, industrial measurement

Engineering World Professional Engineer Michiganansian Engineer and Contract The Highway Engineer & Contractor Building and Engineering News Annual Report of the Tennessee Valley Authority Proceedings of the ... Annual Meeting Transactions of the Kentucky Academy of Science Safety Engineering Engineering and Mining Journal Iron Trade Review Engineering and Boiler House Review The Engineering Index Annual for ... ASME Transactions Transactions of ASME. Aviation Week & Space Technology Documents of the Assembly of the State of New York Who's who in Engineering Engineering & Building Record and the Sanitary Engineer Tennessee Valley Authority Indiana Engineering Society Kentucky Academy of Science American Society of Mechanical Engineers New York (State). Legislature. Assembly John William Leonard

Engineering World Professional Engineer Michiganansian Engineer and Contract The Highway Engineer & Contractor Building and Engineering News Annual Report of the Tennessee Valley Authority Proceedings of the ... Annual Meeting Transactions of the Kentucky Academy of Science Safety Engineering Engineering and Mining Journal Iron Trade Review Engineering and Boiler House Review The Engineering Index Annual for ... ASME Transactions Transactions of ASME. Aviation Week & Space Technology Documents of the Assembly of the State of New York Who's who in Engineering Engineering & Building Record and the Sanitary Engineer *Tennessee Valley Authority Indiana Engineering Society Kentucky Academy of Science American Society of Mechanical Engineers New York (State). Legislature. Assembly John William Leonard*

list of members in v 1

since its creation in 1884 engineering index has covered virtually every major engineering innovation from around the world it serves as the historical record of virtually every major engineering innovation of the 20th century recent content is a vital resource for current awareness new production information technological forecasting and competitive intelligence the world s most comprehensive interdisciplinary engineering database engineering index contains over 10 7 million records each year over 500 000 new abstracts are added from over 5 000 scholarly journals trade magazines and conference proceedings coverage spans over 175 engineering disciplines from over 80 countries updated weekly

includes a mid december issue called buyer guide edition

Right here, we have countless ebook **Flow Measurement Engineering H Miller** and collections to check out. We additionally have enough money variant types and as well as type of the books to browse. The conventional book, fiction, history, novel, scientific research, as skillfully as various other sorts of books are readily simple here. As this Flow Measurement Engineering H Miller, it ends occurring brute one of the favored books Flow Measurement Engineering H Miller collections that we have. This is why you remain in the best website to look the unbelievable books to have.

1. Where can I buy Flow Measurement Engineering H Miller books? Bookstores: Physical bookstores like Barnes & Noble, Waterstones, and independent local stores. Online Retailers: Amazon, Book Depository, and various online bookstores offer a wide range of books in physical and digital formats.
2. What are the different book formats available? Hardcover: Sturdy and durable, usually more expensive. Paperback: Cheaper, lighter, and more portable than hardcovers. E-books: Digital books available for e-readers like Kindle or software like Apple Books, Kindle, and Google Play Books.
3. How do I choose a Flow Measurement Engineering H Miller book to read? Genres: Consider the genre you enjoy (fiction, non-fiction, mystery, sci-fi, etc.). Recommendations: Ask friends, join book clubs, or explore online reviews and recommendations. Author: If you like a particular author, you might enjoy more of their work.
4. How do I take care of Flow Measurement Engineering H Miller books? Storage: Keep them away from direct sunlight and in a dry environment. Handling: Avoid folding pages, use bookmarks, and handle them with clean hands. Cleaning: Gently dust the covers and pages occasionally.
5. Can I borrow books without buying them? Public Libraries: Local libraries offer a wide range of books for borrowing. Book Swaps: Community book exchanges or online platforms where people exchange books.
6. How can I track my reading progress or manage my book collection? Book Tracking Apps: Goodreads, LibraryThing, and Book Catalogue are popular apps for tracking your reading progress and managing book collections. Spreadsheets: You can create your own spreadsheet to track books read, ratings, and other details.
7. What are Flow Measurement Engineering H Miller audiobooks, and where can I find them? Audiobooks: Audio recordings of books, perfect for listening while commuting or multitasking. Platforms: Audible, LibriVox, and Google Play Books offer a wide selection of audiobooks.
8. How do I support authors or the book industry? Buy Books: Purchase books from authors or independent bookstores. Reviews: Leave reviews on platforms like Goodreads or Amazon. Promotion: Share your favorite books on social media or recommend them to friends.
9. Are there book clubs or reading communities I can join? Local Clubs: Check for local book clubs in libraries or community centers. Online Communities: Platforms like Goodreads have virtual book clubs and discussion groups.
10. Can I read Flow Measurement Engineering H Miller books for free? Public Domain Books: Many classic books are available for free as they're in the public domain. Free E-books: Some websites offer free e-books legally, like Project Gutenberg or Open Library.

Introduction

The digital age has revolutionized the way we read, making books more accessible than ever. With the rise of ebooks, readers can now carry entire libraries in their pockets. Among the various sources for

ebooks, free ebook sites have emerged as a popular choice. These sites offer a treasure trove of knowledge and entertainment without the cost. But what makes these sites so valuable, and where can you find the best ones? Let's dive into the world of free ebook sites.

Benefits of Free Ebook Sites

When it comes to reading, free ebook sites offer numerous advantages.

Cost Savings

First and foremost, they save you money. Buying books can be expensive, especially if you're an avid reader. Free ebook sites allow you to access a vast array of books without spending a dime.

Accessibility

These sites also enhance accessibility. Whether you're at home, on the go, or halfway around the world, you can access your favorite titles anytime, anywhere, provided you have an internet connection.

Variety of Choices

Moreover, the variety of choices available is astounding. From classic literature to contemporary novels, academic texts to children's books, free ebook sites cover all genres and interests.

Top Free Ebook Sites

There are countless free ebook sites, but a few stand out for their quality and range of offerings.

Project Gutenberg

Project Gutenberg is a pioneer in offering free ebooks. With over 60,000 titles, this site provides a wealth of classic literature in the public domain.

Open Library

Open Library aims to have a webpage for every book ever published. It offers millions of free ebooks, making it a fantastic resource for readers.

Google Books

Google Books allows users to search and preview millions of books from libraries and publishers worldwide. While not all books are available for free, many are.

ManyBooks

ManyBooks offers a large selection of free ebooks in various genres. The site is user-friendly and offers books in multiple formats.

BookBoon

BookBoon specializes in free textbooks and business books, making it an excellent resource for students and professionals.

How to Download Ebooks Safely

Downloading ebooks safely is crucial to avoid pirated content and protect your devices.

Avoiding Pirated Content

Stick to reputable sites to ensure you're not

downloading pirated content. Pirated ebooks not only harm authors and publishers but can also pose security risks.

Ensuring Device Safety

Always use antivirus software and keep your devices updated to protect against malware that can be hidden in downloaded files.

Legal Considerations

Be aware of the legal considerations when downloading ebooks. Ensure the site has the right to distribute the book and that you're not violating copyright laws.

Using Free Ebook Sites for Education

Free ebook sites are invaluable for educational purposes.

Academic Resources

Sites like Project Gutenberg and Open Library offer numerous academic resources, including textbooks and

scholarly articles.

Learning New Skills

You can also find books on various skills, from cooking to programming, making these sites great for personal development.

Supporting Homeschooling

For homeschooling parents, free ebook sites provide a wealth of educational materials for different grade levels and subjects.

Genres Available on Free Ebook Sites

The diversity of genres available on free ebook sites ensures there's something for everyone.

Fiction

From timeless classics to contemporary bestsellers, the fiction section is brimming with options.

Non-Fiction

Non-fiction enthusiasts can find biographies, self-help books, historical texts, and more.

Textbooks

Students can access textbooks on a wide range of subjects, helping reduce the financial burden of education.

Children's Books

Parents and teachers can find a plethora of children's books, from picture books to young adult novels.

Accessibility Features of Ebook Sites

Ebook sites often come with features that enhance accessibility.

Audiobook Options

Many sites offer audiobooks, which are great for those who prefer listening to reading.

Adjustable Font Sizes

You can adjust the font size to suit your reading comfort, making it easier for those with visual impairments.

Text-to-Speech Capabilities

Text-to-speech features can convert written text into audio, providing an alternative way to enjoy books.

Tips for Maximizing Your Ebook Experience

To make the most out of your ebook reading experience, consider these tips.

Choosing the Right Device

Whether it's a tablet, an e-reader, or a smartphone, choose a device that offers a comfortable reading experience for you.

Organizing Your Ebook Library

Use tools and apps to organize your ebook collection, making it easy to find and access your favorite titles.

Syncing Across Devices

Many ebook platforms allow you to sync your library across multiple devices, so you can pick up right where you left off, no matter which device you're using.

Challenges and Limitations

Despite the benefits, free ebook sites come with challenges and limitations.

Quality and Availability of Titles

Not all books are available for free, and sometimes the quality of the digital copy can be poor.

Digital Rights Management (DRM)

DRM can restrict how you use the ebooks you download, limiting sharing and transferring between devices.

Internet Dependency

Accessing and downloading ebooks requires an internet connection, which can be a limitation in areas with poor

connectivity.

Future of Free Ebook Sites

The future looks promising for free ebook sites as technology continues to advance.

Technological Advances

Improvements in technology will likely make accessing and reading ebooks even more seamless and enjoyable.

Expanding Access

Efforts to expand internet access globally will help more people benefit from free ebook sites.

Role in Education

As educational resources become more digitized, free ebook sites will play an increasingly vital role in learning.

Conclusion

In summary, free ebook sites offer an incredible opportunity to access a wide

range of books without the financial burden. They are invaluable resources for readers of all ages and interests, providing educational materials, entertainment, and accessibility features. So why not explore these sites and discover the wealth of knowledge they offer?

FAQs

Are free ebook sites legal? Yes, most free

ebook sites are legal. They typically offer books that are in the public domain or have the rights to distribute them. How do I know if an ebook site is safe? Stick to well-known and reputable sites like Project Gutenberg, Open Library, and Google Books. Check reviews and ensure the site has proper security measures. Can I download ebooks to any device? Most free ebook sites offer downloads in multiple

formats, making them compatible with various devices like e-readers, tablets, and smartphones. Do free ebook sites offer audiobooks? Many free ebook sites offer audiobooks, which are perfect for those who prefer listening to their books. How can I support authors if I use free ebook sites? You can support authors by purchasing their books when possible, leaving reviews, and sharing their work with others.

