

## Special Reports

### Higher Quality and More User-Friendly Elevators and Escalators

#### Continuous Innovation of Elevators and Escalators

HARADA Yutaka

#### Elevators and Escalators Aiming at Safety, Reliability, and Comfort

IJIMA Atsushi

Elevators and escalators have become indispensable means of vertical transportation, particularly in high-rise buildings. Nowadays, attention is being focused on securing the safety of elevators and escalators in the event of an accident or disaster and subsequent restoration. Innovative measures are expected to be taken both by manufacturers and the government. Although most people may assume that elevators and escalators are well-matured products, in fact they are still under study for improvements not only in terms of safety, but also comfort, ease of use, provision of advanced services, and environmental preservation.

#### Measures for Elevator Earthquake Safety and Security

IJIMA Tomoki/NAKAMURA Kuniko/MAEZATO Tomoki

There have been calls for elevators offering improved safety and security following the confinement of passengers within an elevator car in an earthquake that occurred in northwest Chiba Prefecture in July 2005. To meet this requirement, Toshiba Elevator and Building Systems Corp. (TELCO) began selling security-enhanced standardized elevators on July 20, 2006. These security-enhanced elevators have preparatory running modes to prevent the cessation of operation or confinement accidents in the event of an earthquake; namely, restart mode, emergency escape mode, and automatic restoration mode. In addition, TELCO has developed a new type of elevator security camera system to meet the social demand for crime prevention in elevator cars. The camera is the first in the industry to be equipped with a removable memory card, which can be accessed only by the caretakers, instead of a built-in hard disk drive. This facilitates investigations into elevator crimes.

#### Magnetic Suspension System for Elevators

ITO Hiroaki/MORISHITA Mimppei/YAMAMOTO Akira

Toshiba and Toshiba Elevator and Building Systems Corporation have been making efforts to develop a magnetic suspension system to support an elevator car without touching guide rails. This system aims at realizing the smooth running of an elevator car by installing magnet units on it and controlling their magnetic forces so that the car is supported while running without coming into contact with the guide rails. The magnetic suspension system not only reduces running vibration and noise, but also allows the use of roughly machined rails instead of precision-finished rails, thus reducing the overall cost of elevator construction.

In verification tests, the magnetically suspended elevator operated with vibrations not exceeding 0.1 m/s<sup>2</sup> and consumed only 20 W of additional power on average.

#### Universal Design for Elevators

KIBE Tetsuji/KEDA Kyoichi/NAKAO Kazuhiko

Due to their public nature, elevators must be able to be used safely and reliably by all members of society. Toshiba Elevator and Building Systems Corporation has been making efforts to offer user-friendly elevators on the basis of universal design, as exemplified by the standard type SPACEL-EXTM machine-roomless elevator.

Recently, responding to increasing concerns about the safety of elevators, we have developed safety devices to prevent passengers from being caught by door cases or hit by door panels. We have also developed devices for the convenience of people with physical or visual disabilities. Our latest elevator cars are furnished with devices to assist people with hearing disabilities when the car is fully loaded.

#### Latest Escalator Technologies

MAEDA Atsushi/TAKASAWA Satoshi/YOSHIDA Masato

In recent years, various requirements have arisen in society with respect to escalators and moving walkways following the revision of the Building Standards Law and the enactment of the Barrier-Free Transportation Law in 2000. Reduction of installation space is an important aspect of satisfying requirements from the building facilities or environmental protection perspectives, while universal design also needs to be promoted for the convenience of users. Toshiba Elevator and Building Systems Corporation has developed newly designed escalators and moving walkways that offer a smoother and more comfortable ride to meet these requirements. Control boards have been miniaturized by using the intermittent inverter method, and the underfloor structure of moving walkways has been made thinner to save space. Our standard Kindmover™ escalator has been designed to conform with all overseas standards. We are making efforts from a global standpoint to supply user-friendly escalators throughout the world.

#### Maintenance Support Tool Using Cellular Phones for Elevators and Escalators

KOTANI Toshiyuki/KIMURA Kazuo/HAYASHI Takayuki

More than 100 million cellular phones, including those of the personal handy-phone system (PHS), have been sold in Japan so far. The penetration rate is approaching 80%, and the functionality of the phones continues to progress. People are using cellular phones not only as telephones but also as a means of sending and receiving e-mail and browsing websites. In this context, cellular phones are now beginning to be used as high-technology business tools.

Toshiba Elevator and Building Systems Corporation has long been involved in integrated business activities related to elevators and escalators, encompassing sales, engineering, manufacturing, installation, adjustment, and maintenance, as well as the development of maintenance support tools to improve the efficiency of maintenance work. We have now developed a new type of maintenance support tool for elevators and escalators that fully utilizes cellular phone functions and has actually improved the efficiency of field maintenance work.

#### Further Development of Super-Sized, Super-High-Speed Elevators

TANAKA Kazuhiro/TAKASAKI Kazuhiko/YAMADA Hisashi

Skyscraper construction continues with unabated vigor in Asia, especially in China. Toshiba Elevator and Building Systems Corporation. (TELCO) has received an order for the installation of elevators in the Shanghai Hills project, by virtue of its world reputation in the construction of high-technology and high-speed elevators for such high-rise buildings as Izumi Garden Tower, Roppongi Hills, and the Taipei 101 Building. TELCO has developed two types of elevators based on the elevator technologies developed for Taipei 101. One is a powerful double-deck elevator with two cars whose pitch distance is adjustable and can be aligned to the floors, and the other is a super-high-speed elevator. Both of these elevators comply with Chinese regulations. They are run by a group control system (GCS) that will be indispensable for future elevators in large-scale buildings.

## Feature Articles

#### Development of Novel Transparent Phosphorescent Compounds and Their Application to Emission Devices

IWANAGA Hiroki/AIGA Fumihiko/AMANO Akio

Colorless and transparent fluorescent materials are being rapidly developed due to their potential use in LED illuminators, displays, ornaments, and other applications.

Toshiba focused its attention on rare-earth complexes that are transparent when dissolved in polymer, as candidates for transparent fluorescent materials. Novel rare-earth complexes with excellent solubility, emission intensity and durability were developed by specifically investigating their molecular structures and properties through the application of computational chemistry. Toshiba's aim is to bring transparent fluorescent materials to the lighting market and to a variety of application fields where the see-through feature will be useful.

#### W52T CDMA Cellular Phone Handling One-Segment TV and Digital Radio Broadcasting

AKIYAMA Kenji/SERAKU Hirokazu/TSUMURAYA Tsuyoshi

One-segment broadcasting (known as "One-Seg" in Japan) is a digital terrestrial TV broadcasting service for cellular phones as well as moving vehicles, etc. It features clear moving pictures and interactive services using telecommunication. Digital terrestrial audio broadcasting, commonly referred to as "digital radio," offers not only clear and high-quality sound comparable to that of CDs but also a wide array of data broadcasting services including text data, still pictures, and simplified moving pictures.

In response to these new broadcasting services, Toshiba has developed the W52T Code Division Multiple Access (CDMA) cellular phone for the Japanese market. This model offers advanced picture quality with a wide and high-precision liquid crystal display (LCD) in a sliding chassis. It can also play and record high-quality moving pictures as it has a large-capacity memory and is equipped with a new multimedia processing large-scale integrated circuit (LSI). These features make the W52T model a top-of-the-line multimedia cellular phone.

#### Expressway Tollgate Lane Monitoring System with Improved Functions by Digitization

HASHIMOTO Kazuyuki

The mechanization of expressway toll collection has been promoted to save labor and improve efficiency. Toshiba has supplied a series of toll collection systems over the years. Nowadays, expressway corporations wish to make improvements not only in efficiency through labor saving, but also in services.

To meet their requirements, we have developed a new expressway tollgate lane monitoring system offering enhanced capabilities.

#### Visible Light ID System

UENO Hideki/SATO Yoshiyuki/KATAOKA Atsushi

Visible light communication (VLC), a new communication technology, utilizes visible light as its name suggests.

Toshiba has developed communicative spotlight equipment that conforms with the standard for visible light tags, which have been highly evaluated but are still under study. As the receivable area of VLC can be focused, it can be used in intelligent transport systems (ITS) to inform pedestrians of their location and provide them with navigation data as well as various types of display information.

## Frontiers of Research & Development

#### Online Recognition of Superposed Handwritten Characters for Mobile Devices

#### Multiband Internal Antenna Technology for Notebook PCs